THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

VOL. XXIV. No. 596.] LONDON, OCTOBER 13, 1874. [26TH YEAR.] Price 6d.

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These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Established at the commencement of Gas Lighting.
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16, SOHO SQUARE,
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J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
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MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
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236, GEORGE STREET, GLASGOW; AND 15, MARKET STREET, MANCHESTER.

G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

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FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

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ESTABLISHED 1840,

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Including Chandeliers, Pendants, Hall Lamps, Brackets, Star and Sun Lights of all designs.

WET & DRY GAS-METERS,

Combining most recent improvements in principle and manufacture; upwards of 200,000 already in work, giving highest satisfaction.
(A guarantee of five years given with every Meter.)

PLUMBERS WORK, including Lift and Force Pumps; Cocks for Gas and Water and Steam; Brass Fittings.

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OF THE HIGHEST EXCELLENCE,

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GAS-FITTERS TOOLS, STEAM COCKS, AND ALL KINDS OF JOINTS.

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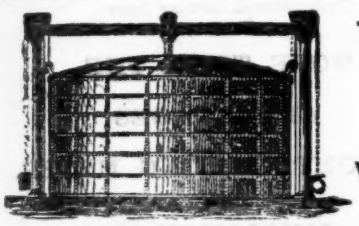

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STATION & CONSUMERS WET OR DRY METERS, STREET & SERVICE MAINS, LAMP COLUMNS & BRACKETS, & WROUGHT-IRON TUBES AND FITTINGS; WROUGHT-IRON ROOFS FOR ANY SIZE OF BUILDINGS.

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AND PATENTEES OF THE IMPROVED COMBINED CONDENSING AND PURIFYING APPARATUS SO EMINENTLY ADAPTED FOR EXPORTATION.

REFERENCES TO UPWARDS OF 300 GAS-WORKS.

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THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

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SAMUEL H. JOHNSON, } Joint Managing Directors.

WARNER AND COWAN'S
SELF-REGULATING GAS-METER.

PRACTICALLY UNVARYING MEASUREMENT WITH VARYING WATER-LINE.

Upwards of 60 cubic inches of Water may be withdrawn from a 3-light non-fountain Meter, and Registration not lessened.

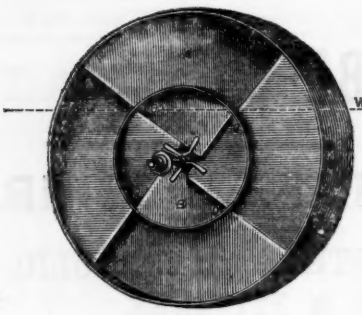

Fig 1.
Front View of Drum, with hollow Cover removed.

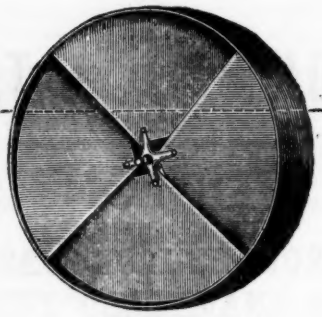

Fig. 2.
Back View, same as Ordinary Meter.

Fig. 3.
Back removed, showing Inner Drum.

BY LETTERS PATENT
FOR
GREAT BRITAIN,
FRANCE,
AUSTRIA,
PRUSSIA,
BELGIUM,
AND THE
UNITED STATES OF AMERICA.

Fig. 4.
Side View, partly in Section.

MORE THAN THE ADVANTAGES OF COMPENSATING METER,
WITH
SIMPLICITY OF COMMON METER,
AND
INCREASED RANGE OF FLOAT.

DESCRIPTION.

The measuring portion of the ordinary Wet Meter drum, when in action, is but an annulus, varying in its capacity with the water level.

In the "PATENT SELF-REGULATING DRUM," one-half of this annulus, A, is made rigid and unvarying by the insertion of the smaller measuring-drum, B, which is of similar construction to the large one, but with its chambers so arranged that its inlet-hoods, *i i i i*, fig. 3, are within the chambers of the latter, and its outlet-hoods, *o o o o*, fig. 1, within its cover.

The quantity of gas discharged at each revolution is practically the contents of the annulus, A, bounded by a circle corresponding with the periphery of the small drum, because the gas contained between the water-line and that point (in the portion of large drum which the small one does not occupy) passes into the latter, and is returned under the cover to be remeasured, along with the supply entering by the spout.

It follows that any alteration of the water-level will affect both drums equally, and make no practical difference in the quantity passed. The lights also will be found quite steady, and the difference of pressure between inlet and outlet practically the same as in the ordinary Wet Meter. Large Meters also can now be made *with* floats.

We are kindly permitted to publish the following opinion of Warner and Cowan's Patent Self-Regulating Drum, by WM. RICHARDS, ESQ., *"Inventor of the Dry Gas-Meter," reviser of "Hughes on Gas-Works," Consulting Gas Engineer.*

"Your improvement in the Wet Meter is decidedly the best that has been introduced since its invention; exceedingly beautiful and simple, which renders the instrument mathematically correct, and infinitely more accurate than any means in general usage for the measurement of liquids."

SOLE LICENSEES AND MANUFACTURERS:

W. & B. COWAN,

ESTABLISHED 1827.

KING HENRY'S WALK,
BALL'S POND ROAD,
NEAR DALSTON JUNCTION STATION.
LONDON, N.

BUCCLEUCH ST. WORKS,
EDINBURGH.

FOR RESULT OF TESTING, SEE OPPOSITE PAGE.

WARNER AND COWAN'S SELF-REGULATING GAS-METER.

Certificate by Mr. G. MILLS,

METER INSPECTOR TO THE METROPOLITAN BOARD OF WORKS.

Meter Inspector's Office, St. Ann's Street, Westminster, S.W., Aug. 7, 1874.

GENTLEMEN,—The 3-light Patent Wet Meter sent to this office has been tested by me at ·5 and 1·0 inch pressures, and at the extreme range of the water-lines I find only a difference of 0·62 per cent. in its registration.

I am, Gentlemen, yours obediently,
G. MILLS.

Messrs. Cowan.

Certificate by Mr. G. DETHRIDGE,

METER INSPECTOR TO THE METROPOLITAN BOARD OF WORKS.

Meter Testing Office, Southwark Street, London Aug. 13, 1874.

GENTLEMEN,—I have submitted the 3-light Wet Meter (Warner and Cowan), No. 86, Self-regulating Drum, to the following tests, 18 feet per hour passing through the meter at each test, viz.:—At ½-inch pressure, with the water filled up to the overflow of the waste-box, then at 1, 1½, 2, 2½, and 3 inches pressure. One half-pint of water was drawn off, and the tests repeated; a second half-pint was drawn, and the tests repeated; a third half-pint was drawn off, the tests again repeated; and a fourth half-pint was taken out, with a repetition of the tests.

The results were carefully noted, and a second series of tests were carried out, confirming the original experiments.

The results are appended.

Rate per Hour, 18 Cubic Feet.

Pressure.	At High Water Level.	With Half a Pint off.	With One Pint off.	With One and a Half Pint off.	With One Quart off.
5-10ths.	0·20 fast	0·30 fast	0·80 fast	0·60 fast	0·60 fast
10 ,,	0·40 ,,	0·20 ,,	0·20 ,,	correct	0·20 slow
15 ,,	0·20 ,,	correct	correct	,,	correct
20 ,,	0·40 ,,	0·60 fast	0·40 fast	0·40 fast	0·40 fast
25 ,,	0·40 ,,	correct	correct	0·20 slow	correct
30 ,,	0·20 ,,	,,	0·20 slow	correct	,,

Messrs. W. and B. Cowan. G. DETHRIDGE.

Certificate by Mr. HENRY AIREY,

METER INSPECTOR TO THE METROPOLITAN BOARD OF WORKS.

Meter Inspector's Office, White Lion Street, Shoreditch, Aug. 21, 1874.

Gentlemen,—I beg to say I have tested the 3-light Wet Meter (Warner and Cowan's Patent) under various conditions, as stated below, as also the results.

I am, Gentlemen, yours obediently,
HENRY AIREY, Inspector.

Rate per Hour, 18 Cubic Feet.

Pressure.	High Water Line.	Two Gills off.	Four Gills off.	Six Gills off.
5-10ths.	0·80 fast.	0·20 fast.	0·40 fast.	0·60 fast.
10 ,,	0·80 ,,	..	..	..
15 ,,	0·80 ,,	..	..	..
20 ,,	0·80 ,,	..	..	..
30 ,,	0·80 ,,	..	..	0·60 fast.
35 ,,	0·80 ,,	..	..	..

Meter passing 15 feet per hour at low water line with 3-10ths pressure, 1·01 fast.

The tests at variable pressures were only made at high water line, with one exception, it being a matter, in my opinion, of no moment, as any difference would be the result of either an increase of speed or incorrect observation.

Each of these experiments were made repeatedly, with the same results.

Messrs. W. and B. Cowan.

Certificate by Mr. H. SPORNE,

METER INSPECTOR TO THE CITY OF LONDON.

City of London Gas-Meter Inspector's Office, Lower Whitecross Street, London, E.C., Aug. 20, 1874.

Gentlemen,—At your request I have tested your new Wet Meter, and I herewith hand you the results, which are very pleasing.

I am, Gentlemen,
Yours obediently,
H. SPORNE.

Messrs. W. and B. Cowan.

Test of 3-Light Warner and Cowan's Patent Meter, Passing 18 Feet per Hour at Each Test.

Pressure.	At High Water Line.	With Half a Pint of Water off.	With One Pint off.	With One and a Half Pint off.	With Two Pints off.
5-10ths.	0·00	0·00	0·00	0·20 slow	0·60 slow
10 ,,	0·00	0·20 slow	0·20 slow	0·30 ,,	0·60 ,,
20 ,,	0·00	0·40 ,,	0·40 ,,	0·00	0·60 ,,
30 ,,	0·00	0·60 ,,	0·40 ,,	0·00	0·80 ,,

The lights in each were firm and steady.

Certificate by Mr. B. M. M'CRAE,

ENGINEER TO THE DUNDEE GAS COMMISSIONERS.

Dundee Gas Commission, Engineer and Manager's Department, Dundee, Aug. 10, 1874.

Gentlemen,—We received sample meter, Warner and Cowan's Patent 3-light, which we have subjected to several tests, of which the following are the results:—

Pressure.	True Water Line.	Seven Gills off.
5-10ths.	1 per cent. fast.	1 per cent. fast.
10 ,,	1 ,,	Net.
20 ,,	Net.	1 per cent. fast.
30 ,,	Net.	1 ,,

These results are very satisfactory, and prove that said meter, so far as I am aware, surpasses anything that has hitherto been produced.

I am, Gentlemen, yours, &c.,
B. M. M'CRAE.

Messrs. W. and B. Cowan.

Certificate by Mr. R. FERRIER,

METER INSPECTOR, EDINBURGH.

Inspector of Meters Office, City Chambers, Edinburgh, Aug. 13, 1874.

Gentlemen,—I herewith beg to append the results of my testing from the 8th inst. to this date, 5-light No. 183,127, Warner and Cowan's Patent Drum *non-Fountain* Gas-Meter.

These are the average results of many experiments which, I must say, varied very little.

I find that the meter supplies its full quantity, and the valve does not close until upwards of 14 gills of water are extracted.

CAPACITY—Per Revolution ·25 Cubic Feet; Per Hour 30 Feet.

Pressure.	When filled with Water to Overflow.	Four Gills off.	Eight Gills off.	Twelve Gills off.
0·5 in.	0·5 fast.	0·3 slow.*	0·2 fast.	0·5 fast.
1·0 ,,	0·6 ,,	0·4 ,,	Net.	0·3 ,,
2·0 ,,	0·5 ,,	0·2 ,,	0·4 fast.	0·5 ,,
3·0 ,,	0·5 ,,	0·2 ,,	Net.	0·5 ,,

R. FERRIER,
Chief Inspector of Meters, Edinburgh.

Messrs. W. and B. Cowan.

Certificate by Dr. WALLACE, F.R.S.E., F.C.S.,

GAS EXAMINER FOR THE CITY OF GLASGOW.

Chemical Laboratory, 42, Bath Street, Glasgow, Aug. 3, 1874.

I have made a careful examination of a 3-light Warner and Cowan's Self-regulating Gas-Meter, and I have no hesitation in saying that it is the most perfect meter that has come under my notice. The construction is beautifully simple, and the works are not more liable to accidental derangement than those of the common wet meter. While an ordinary 3-light meter gave a variation in the registration of 5 per cent. when tested at the high and low water levels, with a difference of 3½ gills of water, the patent meter, with a difference of 7½ gills, or 62·8 cubic inches in the quantity of water, varied in the registration only 0·2 per cent. These tests apply to the ordinary half-inch pressure at which meters are tested according to Act of Parliament, but an increase to a working pressure of 3 inches gave results equally favourable to the patent meter. The common wet meter showed a variation in the registration by the increase of pressure of 1 to 1·5 per cent., according to the level of the water, while the self-regulating meter gave a variation resulting from the increase of pressure of ·6 at the high level to 1 per cent. at the low level. The greatest error at any pressure and any level of water was, with the common meter, 3·8 per cent., and with the patent meter ·8 per cent.

The following is a statement of the various trials to which the patent meter was subjected:—

Pressure.	Highest Level.	Two Gills off.	Four Gills off.	Six Gills off.	Seven and a Quarter Gills off
Half an inch . .	0·8	0·4	0·4	0·8	0·6 fast.
Three inches . .	0·2 fast	..	..	..	0·4 slow.

Such extremely accurate performance, combined with such an extensive variation in the quantity of water, leaves nothing further to desire in the measurement of gas.

WILLIAM WALLACE.

* In the JOURNAL for Sept. 1 this was printed, in error, as "3·3 slow."

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WORKS: COMMERCIAL ROAD, EXETER,

INVITE THE ATTENTION OF GAS COMPANIES AND OTHERS FOR THE SUPPLY OF

EVERY DESCRIPTION OF GAS APPARATUS.

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

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RETORTS and RETORT-HOUSE FITTINGS, CONDENSERS, SCRUBBERS, ENGINES and EXHAUSTERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, &c.

METER DEPARTMENT.

They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

GAS-FITTING DEPARTMENT.

An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS, MEDIÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

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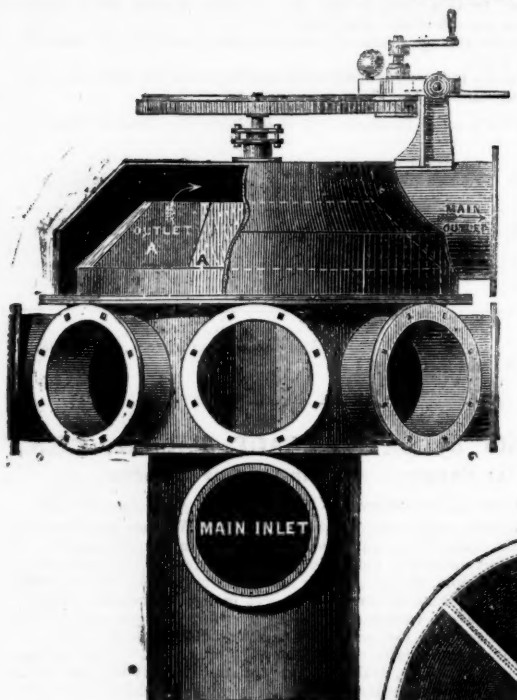
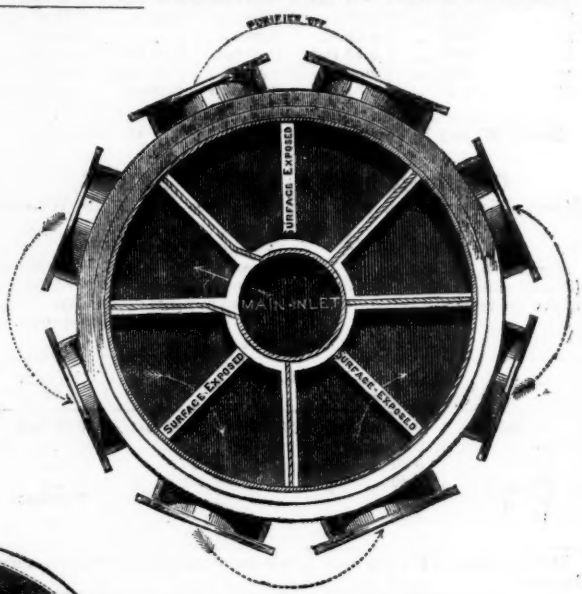
GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.

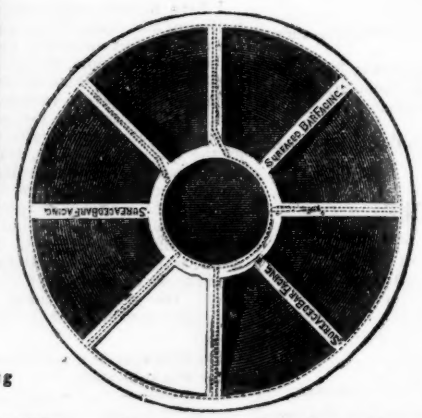
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

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LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

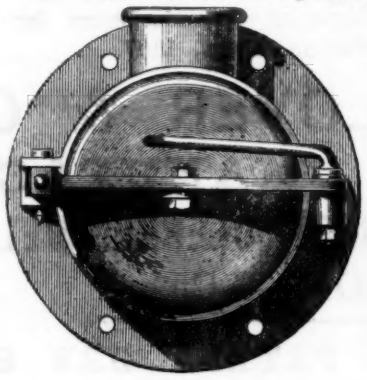
HOLMAN'S PATENT ECCENTRIC FASTENINGS & ANTI-FRICTION CATCHES.

OVER 10,000 IN USE.

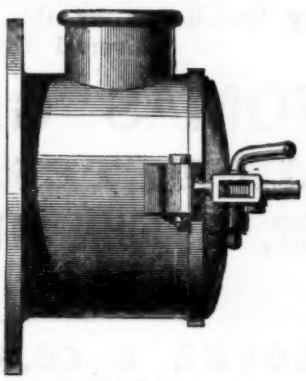
NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW.



SIDE VIEW.

SIMPLE.

ECONOMICAL.

DURABLE.

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

These Lids are Adopted by the following (among many other) Gas Companies:—

The Gaslight Company, Beckton (where over 2000 are in use).	The West Ham Gas Company.	The Salford Corporation Gas-Works.	The Carmarthen Gas-Works.
" Gaslight Company, Bow Common.	" Imperial Gaslight Company.	" Rochdale Corporation Gas-Works.	" Merthyr Tydfil Gas-Works.
" London Gaslight Company.	" Gas-Works, Arsenal, Woolwich.	" Liverpool United Gas-Works.	" Ystrad Gas-Works.
" Independent Gaslight Company.	" Commercial Gas Company.	" Birkenhead Gas-Works.	" St. Alban's Gas-Works.
" Phœnix Gaslight Company.	" Alliance and Dublin Gas-Works.	" Birmingham Gas-Works.	" Over Darwen Gas-Works.
" South Metropolitan Gaslight Co.	" Edinburgh Gas-Works.	" Nottingham Gas-Works.	" Aylesbury Gas-Works.
	" Manchester Corporatn. Gas-Works.	" Newcastle-on-Tyne Gas-Works.	" Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial has been given:—

THE GASLIGHT AND COKE COMPANY

(Commonly called the Chartered Gas Company),

BECKTON, NORTH WOOLWICH, July 2, 1874.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them.

I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly,

(Signed) G. C. TREWBY.

P.S.—We shall have very shortly about 3000 of your Lids in use.

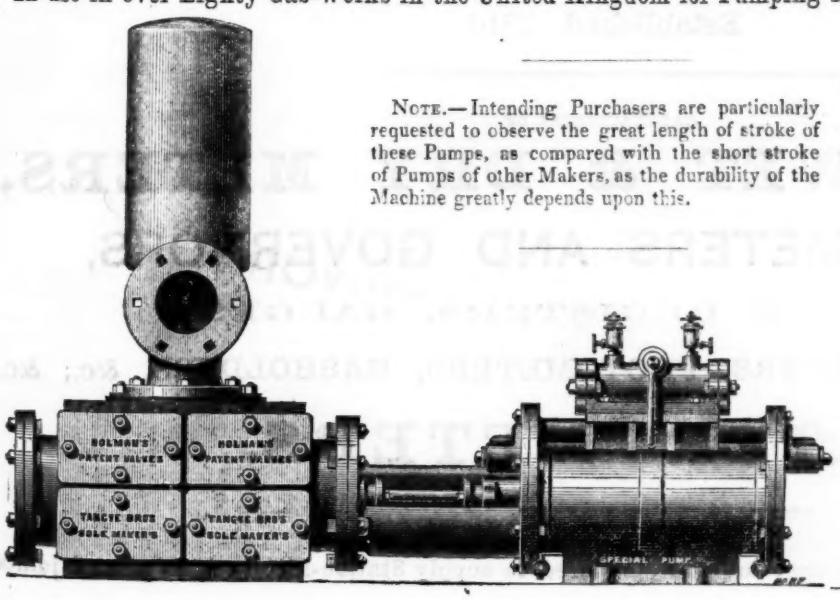
GREAT REDUCTION IN PRICES

OF

THE "SPECIAL" DIRECT-ACTING STEAM PUMPS.

Nearly 4000 have been sold since their introduction in 1867.

In use in over Eighty Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.



NOTE.—Intending Purchasers are particularly requested to observe the great length of stroke of these Pumps, as compared with the short stroke of Pumps of other Makers, as the durability of the Machine greatly depends upon this.

The following are a few of the leading Sizes:—

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons per Hour, Approximate.	Price.
3	1½	9	550	£16
4	2	9	970	18
3	3	9	2,200	18
4	3	12	2,200	20
6	3	12	2,200	25
4	4	12	3,900	25
6	4	12	3,900	30
6	5	12	6,100	35
7	5	12	6,100	40
8	5	12	6,100	45
6	6	12	8,800	40
8	6	12	8,800	50
7	7	12	11,900	50
10	7	12	11,900	65
8	8	18	15,660	65
10	8	18	15,660	75
10	9	24	19,800	90
12	9	24	19,800	110
10	10	24	24,400	100
14	10	24	24,400	140
12	12	24	35,240	140
21	12	36	35,240	285
14	14	24	47,960	180
26	14	48	47,960	450

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

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THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

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PATENT WET & DRY METERS,

STATION-METERS AND GOVERNORS,

PRESSURE REGISTERS, GAUGES,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, OCTOBER 13, 1874.

Circular to Gas Companies.

THE vague terms of the resolution carried in the Court of Common Council recently, and the tame conclusion arrived at by the Gas Committee of the Corporation, as stated in the report we have printed, leave us altogether in doubt as to the action which may ultimately be taken by the Corporation on the gas question. The resolution of the court sent the report back to the committee with an instruction to them "to take whatever steps may be "necessary, by Act of Parliament or otherwise, for power to supply "a good and cheap supply of gas to the citizens." In the report of the committee, which we have also printed, it was simply recommended that they should be authorized to confer with the President of the Board of Trade, "with the view of inducing him to take steps to remedy the evils adverted to, or, if necessary, to favour the introduction of a measure to remedy the abuses existing under present legislation." Independent action on the part of the Corporation did not appear to be thought of at first; but, warmed up by the heat of discussion, and stimulated perhaps by the example of the Metropolitan Board, the chairman seems to have been driven to the conclusion that the Corporation ought to have a Bill of their own. Whether the committee will eventually decide on the wasteful expenditure of City funds involved in an useless application to Parliament, or whether they will content themselves with the more economic course of having the contemplated conference with Sir Charles Adderley (the only expense of which would be carriages to take them to Whitehall, and a luncheon before or a dinner after the interview), remains to be seen. The considerations mentioned in our last induce us to think they will decide on having a little Bill in Parliament, and a large one of another kind with agents, lawyers, and others. Let it be so. The gas company concerned may regard either proceeding with perfect equanimity, certain of the result in each eventuality.

The Metropolitan Board of Works talk of co-operation with the Corporation of London; but it is difficult to see the bond of union between the two on this question. They can join in an outcry for "cheap gas;" but supposing each obtained power to attempt the supply, they must be hopelessly divided. One thing is perfectly certain, and that is that as a preliminary to either corporate competition with, or corporate purchase of, the gas companies, a municipal government for the whole of London must be settled. We rejoice to see the strong hold this opinion seems to have taken on the metropolitan mind. Public writers even in *The Times* are beginning to speak as if a metropolitan municipality were an accomplished fact; but, in reality, much has to be done and overcome before the great desideratum is arrived at. It will take two, if not three, sessions of Parliament, even if the Government adopt the measure, to model an Act which will give a real and reasonable self-government to London. Outside the City there will be little more than ignorance and indifference to encounter in opposition. The average London householder has had the conclusion forced upon him that he must be rated, and it has become a matter of perfect indifference to him who imposes the rates he is compelled to pay. Then there are those who profit by the present system of divided authority, and who will, no doubt, endeavour to persuade their dupes that a corporation will be expensive. A strong voice will, however, silence these objectors. The great obstacle to a municipal corporation for the whole metropolis will be found in the Corporation of the City of London. Although the members are relatively inferior in intelligence and social standing to the members of the smallest Local Board in the kingdom, the Corporation of London holds a position which is well-nigh impregnable; and yet, without some changes in it, a sound municipal government will be impossible. What changes are required to make the office of Common Councillor an object of ambition to gentlemen of education and position we need not here point out, nor need we speculate as to whether the Corporation will "rise to the occasion," as Mr. Chamberlain Scott promised they would, if it were presented. The present game is to harass the gas companies, and that is a simple business. We have no fear of the result. Without knowing the designs of the Corporation, we know that a good answer is to be made to any accusations they may bring against the companies; and if their object be competition, we know that Parliament will never allow it, any more than they will sanction the confiscation of 30 per cent. of the shareholders property, which would seem to be suggested.

At the last meeting of the Metropolitan Board of Works, Mr. Leslie, by moving for a return of "the number of miles of road-"ways within the metropolis, as a whole," endeavoured to give the Board some idea of the magnitude of the undertaking they proposed to embark in when they decided to compete with the gas companies. The Board saw the joke, and rejected the motion. We have not the last report of the Chief Commissioner of Police before us, which would help us to the information; and, unfortunately, there is not at this moment a return of the total number of miles of mains laid down by the metropolitan gas companies. The Paris Gas Company have 960 miles of mains, but Paris is a compact city, and the gas-works are so arranged as to avoid unnecessary extensions of mains. The Alliance and Dublin Company have 3000 miles. We can only at present hazard a conjecture as to the length of mains laid down in the metropolitan district; but between Beckton on the one side and Fulham or Wormwood Scrubs on the other, and between Lewisham on the south and Hampstead Heath on the north, there must be many thousands (probably ten) of miles of pipes which the Metropolitan Board would have to duplicate before they entered on effective competition with the companies. It is not without reason that those acquainted with the manufacture and distribution of gas tell the Board that no greater misfortune could befall them than

that they should carry the Bill they propose to introduce next year.

We may congratulate the chairman of the Phœnix Company on having made a very effective speech at the recent half-yearly meeting. He supplied a complete answer to those who, from ignorance or malice, will persistently assert that the increased value of residuals will make up for any increase in the price of coal. The works of the Phœnix Company are well situated for the profitable sale of coke, but it will be seen that the sum realized for that residual fell a long way short of making up for the advance in coal. A good point was also made in explaining that the maximum dividends of the company do not amount to the 10 per cent., against which such an outcry is now made, but, on the average, are only £8 2s. per cent., and will in time be reduced to about 7¾ per cent. It is probable that one-half of the 871 shareholders in the concern do not get more than, if so much as, 6 per cent. on their investment. To the illustrations of the difficulty of raising money for gas undertakings at a low rate of interest, another might have been added of a leading company who tried to issue debentures at 4 per cent., but failed almost entirely in getting them subscribed for. In face of the opposition so persistently made to the companies, and the supposed danger of the manufacture of gas becoming obsolete, there is really a difficulty, which will probably increase, in raising money for the necessary extension of undertakings. A corporation who can offer the rates as a security in addition to the works may not find it difficult to obtain money at 4 or 4½ per cent.; but it is very different with a gas company. *A propos* to the threatened opposition of the Metropolitan Board, Mr. Horner made some very judicious remarks, which well deserve the serious consideration of the members. It is, we believe, perfectly true to say that the desire of the Board is simply to depreciate the value of the gas undertakings. The majority of the members hold no gas property, and their simple wish is to confiscate and achieve popularity. We may say the same for the Common Council. As Mr. Cyrus Legg bluntly put it, "There are many "people who want to make capital out of the companies because "they have very little capital of their own."

The meeting of the South Metropolitan Company, of course, passed off pleasantly enough. There was ample occasion for congratulation, although the business in the past half was not very profitable. The chairman's explanation of the appropriation of the "undivided balance" was well timed, because there are some who object to a gas company having any considerable balance of unappropriated profits and a full reserve-fund also. We may here correct an error into which we fell respecting the amount of sulphur in the South Metropolitan Company's gas. The maximum in the last quarter was 23·6 grains per 100 feet, and the mean only 12·94 grains. Thus, the company keep well within the limit fixed by the referees, although debarred from the use of lime. As to the means of purification employed, we hope to receive information.

The only remark suggested by the proceedings at the meeting of the Surrey Consumers Company is that there, as everywhere, the most determined opposition to the proceedings of the Metropolitan Board was expressed. We agree with one speaker that it will be quite soon enough for the Board to think of supplying gas when they have made sewers that will carry off storm waters without flooding a large number of houses, the owners and occupiers of which are denied all compensation for damage occasioned. The particular thing the Board was called into existence to do is still very inefficiently done; and some ratepayers might object that they have paid their 3d. in the pound for a good many years simply to incur the risk of having their property damaged whenever there is a particularly heavy fall of rain.

The directors report and the accounts of the London Gas Company tell the common tale of a deficiency of profit, and the necessity of making up the dividend from the reserve-fund. The draw made on the fund is rather large, amounting to £10,469. As the accounts are published in the Board of Trade form, we can follow the details, which are a little complicated by the circumstance that the company buy, as well as manufacture, gas. Taking common gas, we find that the make has been equal to 9482 cubic feet per ton, and the quantity accounted for is 8294 cubic feet. Calculating, however, from the total amount of gas both bought and made, which will be the true test of the condition of the distributing plant, we find that the quantity of gas unaccounted for is only about 8 per cent. This result is a fair one, but capable of improvement.

The Birmingham Corporation do not appear dismayed at the condition of affairs with the gas companies, and, while agreeing to the resolution of Alderman Sadler, entertain not the smallest notion of relinquishing their bargain. It is recognized that the present state of things is of a purely temporary character, and will soon be rectified by time, and, in the case of one undertaking, better management.

The Town Council of Liverpool have discussed the propriety of appointing a special committee to consider the advisability of the Corporation taking the supply of gas into their hands—in other words, purchasing the undertaking of the Liverpool United Company, for there, as elsewhere, competition is out of the question. Since the municipal elections are imminent, the Town Council decided to leave the appointment of the committee to the newly-elected councillors. The immediate result is that the supply of gas will be *the* question at all ward meetings, and no doubt the new Town Council will contain a large majority pledged to prompt action in the matter. It is useless to attempt to conceal the fact that the Liverpool Company are unpopular to a degree not known in the case of any metropolitan company. Much that is alleged against the company is quite unfounded. The gas supplied is excellent, and the price, considering the quality, cannot be regarded as exorbitant. On that score the public in Liverpool have nothing to grumble at. What, however, the Liverpool consumer most complains of, and, we are bound to say, with reason, is the arbitrary exaction of deposits—extravagant in their amount, according to Dr. Cross—on which the company pay no interest. It is very well for a company to make their customers find them trading capital for nothing, but such a proceeding is certain to excite discontent, and must tell strongly against them before a parliamentary committee. We know nothing of the feeling of the company as regards the sale and purchase of the undertaking, but cannot help thinking that their wisest course would be to sell, if the Corporation offer fair terms.

We have recently congratulated gas companies and parishes on extended applications of the average meter indication system to public lamps. A letter from Mr. George Bower reveals a fraud which we do not for a moment suppose would be perpetrated anywhere but at Oakham, but which, nevertheless, we feel bound to notice, in order that gas companies may be on their guard. Mr. Bower was at one time proprietor of the Oakham works, and he supplied the public lights on the average meter system. He subsequently refused to continue to supply gas on the system, his reason being "that one, or more than one, connected with the "public lighting, was or were guilty of a deliberate fraud by "turning down the lights of the metered lamps while the others, "to which no meters were attached, were turned full on." We are bound to suppose that these frauds were the acts of overzealous officials, of which the Local Board had no cognizance.

The Town Council of Aberdeen have, but not without considerable opposition, agreed to raise the salary of their gas manager. There are men of the Lowman Taylor kind in most Town Councils, but, happily, their unreflecting parsimoniousness is generally neutralized by the influence of others more sensible and generous.

A dastardly attempt is alleged to have been made to damage the gas-works of the Corporation of Bradford, by tampering with the valves. The knowledge that there exist miscreants capable of contemplating such mischief will be sufficient to show managers the necessity of putting the control of valves under lock and key, and only giving access to responsible men. We might add, capable men, also, for we remember a case in which a terrible accident was very nearly caused by the ignorance of the man employed to shift the valves.

Water and Sanitary Notes.

We fear there can be no doubt that scarlet fever is epidemic in the metropolis at the present time, and it may be worth considering whether the steps taken by local authorities to prevent the spread of the disease do not really tend to propagate it. Here, for example, are the proceedings which the vestry of Islington require to be taken when a case of scarlet fever occurs in a house :—

To Cleanse and Disinfect.—A complete fumigation with sulphur must first be carried out. A pound of brimstone, broken into small pieces, should be put into an iron dish (or a lid of an iron saucepan turned upside down) supported by a pair of tongs over a bucket of water. The fire-place and outer openings, such as the crevices of the windows, are then to be closed, by pasting paper over them, and a shovelful of live coals is to be put upon the brimstone. The door is then to be quickly shut, the crevices pasted up with paper, and the room kept closed for five or six hours. Articles of clothing hung up loosely, and beds, bedding, and other things left uncovered in the room, are fumigated at the same time. The paper on the walls must then, in every instance, be wetted with a solution of carbolic acid, stripped off, and burned; and the walls, ceilings, paint, and floors, must be well washed with a solution of carbolic acid. After this a thorough cleaning should be made; everything that can be, washed with a little carbolic acid in the water, and boiled. The room should then be lime-whited, and afterwards left unoccupied with the windows open for a week or a fortnight. Anything short of this is not a proper disinfection.

Now, if we take the case, such as has been brought to our notice, of a poor family occupying one room, the proceedings insisted on necessitate their immediate removal from the lodging. Having but one bed, but little bedding, and no change of clothing, they go off with their infected property to the first room they can find, which will probable be in a house until then free from fever, but

to which they are not at all unlikely to carry it. With a better class of families, who can afford two rooms, the result is likely to be much the same. These, if they do not choose to remove, and consent to have their bedding, &c., fumigated, will be huddled together for a fortnight on the floor of one room, under conditions which, to say the least, are not favourable to the reinstatement of health. We notice that the vestries in the East of London, where a fatal type of the disease appears to prevail, have ordered the bedding, &c., to be entirely destroyed, to be replaced, of course, at the expense of the parish. Marylebone also has its outbreak of scarlet fever, and no doubt Dr. Whitmore will look carefully into the milk-cans to discover its origin.

As we announced in our last, the Water-Works Committee of the Town Council of Hull have resigned, but we regret to see not before they were requested to do so by a vote of the council.

Water affairs at Belper continue in a state which is in the highest degree discreditable to the water company. It seems that the shareholders have never received a dividend, and it is quite clear that the directors, at all events, do not deserve one. Belper is, unfortunately, a declining town, but still has over 8000 inhabitants; but it has never adopted the Local Government Act, and the people in their present extremity thus lack the protection an efficient Local Board would afford them.

The Liverpool Corporation are steadily progressing with their efforts to re-establish a constant supply in all parts of the borough. In the meantime, a thoughtful gift of 1000 tin cans, holding two gallons each, to serve as water reservoirs to the poor in courts and alleys, deserves to be recorded as the act of a liberal and enlightened citizen.

There is still a great scarcity of water in some parts of the North. The surveyor of the Local Board of Morpeth has reported that there is only a fortnight's supply in the reservoir, and that all the feeders are dry. Under these circumstances, the Board determined at once to restrict the supply to three hours a day, and to cut off all supply for trade purposes from yesterday. Newcastle, Gateshead, and Wallsend are all short of water from the same cause. The water company have now resolved to largely increase their pumping power from the Tyne, the water of which the consumers strongly object to; but, for the present, it is clear that the quantity required can be obtained from no other source. The Ulswater scheme finds no favour in Newcastle, chiefly on account of the expense of carrying it into effect, but also in consequence of the reported contamination of the water with lead, which, though present in an infinitesimal quantity, might nevertheless be considered detrimental to health. There are some other schemes before the Town Council, which we may notice on another occasion.

The Town Council of Southampton have had submitted to them a most liberal (?) proposal for the profitable utilization of their sewage, supposing it should contain the excreta of not less than 45,000 inhabitants on the 29th of September, 1876. It is difficult to epitomize the terms, but they come practically to this, that the Crown and the Corporation together are to provide 4000 acres of land in the New Forest, about five miles from Southampton, for which the Corporation are eventually to pay; that a 25 years lease shall be granted to the proposer; that for two years the Corporation shall bear the expenses of pumping the sewage upon the land; and that for the remainder of the term of 25 years the lessee shall pay the expense of pumping, and also the interest on the expenditure and the sinking-fund to repay the money spent on a reservoir, pumping-station, and rising main. There is more that is curious in the proposal. Thus it is stipulated that the Crown shall build a house on the property for the lessee, and also a village of from 80 to 100 houses for labourers. The design of the lessee is to put sewage upon only 1000 acres, and, supposing that the profits on these pay for the pumping, &c., the lessee will have the use of 3000 acres for 25 years for nothing. Certainly, the value of sewage does not seem to rise in the market.

Communicated Article.

THE PRINCIPLE OF THE VALUATION OF GAS COAL.

By D. A. Graham, Stalybridge.

(*Continued from page* 434.)

3rd Example.—A mixture of 64 per cent. of cannel, and 36 per cent. of coal, produced 10,031 cubic feet of 18-candle gas. What was this cannel worth, as compared with the cannel which produced 10,875 cubic feet of 24·25-candle gas?

The commercial value of the gas produced from this mixture, when compared with the mixture which produced 10,742 cubic feet of 18-candle gas, would, of course, be represented by its proportionate value after the proportional value of the carbonizing, the cost of renewals, repairs, interest for use of settings, and other expenses previously enumerated, had been deducted, which expenses were formerly shown to amount to 6s. 8d. per ton carbonized.

Now, if 6s. 8d. represented the value of these several charges for a coal producing 10,742 cubic feet of 18-candle gas, what would the difference of these expenses amount to on a mixture of coal and cannel producing 10,031 cubic feet of 18-candle gas?

$$\frac{10{,}742 \times 6{\cdot}66}{10{,}031} = 7{\cdot}13 = 7\text{s. } 1\tfrac{1}{2}\text{d.}$$

And 7s. 1½d. − 6s. 8d. = 5½d. more for these several charges for the mixture producing 10,031 cubic feet, than for the mixture producing 10,742 cubic feet—12s. 8d. was shown to be the value of the 10,742 cubic feet of 18-candle gas, and 12s. 8d. − 5½d. = 12s. 2½d. would therefore represent the sum from which this proportionate value was to be obtained.

So that—

10,742 : 10,031 :: 12s. 2½d. : 11·42 = 11s. 5d.

11s. 5d. would therefore represent the amount of this proportionate value of 10,031 cubic feet of 18-candle gas.

But the gas in a ton of the coal used in this mixture was shown to be worth 9s. 4½d., and as 36 per cent. of this coal was used in the mixture, the value of the gas produced from this per centage of coal in the mixture would equal 3s. 4½d.

$$\text{For } \frac{9\text{s. } 4\tfrac{1}{2}\text{d.} \times 36}{100} = 40{\cdot}5 = 3\text{s. } 4\tfrac{1}{2}\text{d.}$$

And 11s. 5d. − 3s. 4½d. = 8s. 0½d., which would represent the value of the gas produced from 64 per cent. of the weight of this mixture; 100 per cent. of this gas would therefore be worth 12s. 6¾d.

$$\frac{8\text{s. } 0\tfrac{1}{2}\text{d.} \times 100}{64} = 12\text{s. } 6\tfrac{3}{4}\text{d.}$$

Now, if the gas in this cannel producing 9676 cubic feet of 20·3-candle gas was worth 12s. 6¾d., and the gas contained in the cannel producing 10,875 cubic feet of 24·25-candle gas was shown to be worth 18s. 5½d., what was the value of their difference per candle per 1000 cubic feet?

10,875 × 24·25 = 263·71 candles.
And 9,676 × 20·3 = 196·42 ,,

Their difference will equal 67·29 candles.

And 18s. 5½d. − 12s. 6¾d. = 5s. 10¾d.

$$\text{And } \frac{5\text{s. } 10\tfrac{3}{4}\text{d.}}{67{\cdot}29} = 1{\cdot}05\text{d.}$$

Now the value of the difference of the differences was shown to be equal to 0·98d., from which it would appear that the commercial value of the difference of the differences is the true commercial measure of the value of differences between the productions of gas from different qualities of cannel giving productions of gas intermediate to the qualities and quantities from which the value of the difference of the differences was obtained, and it will be evident that this same value will be an accurate measure of the commercial value of quantities exceeding these productions. Now this cannel produced 1460 lbs. of good coke, 240 lbs. of tar, and 105 lbs. of ammonia water, from which its comparative commercial value can easily be obtained.—Now, if good coal coke on the average sold for 6d. per 100 lbs., the coke produced from this cannel would probably not fetch more than 4½d.; so that the following valuation would represent the value of this cannel:—

The value of the gas would equal	12*s.* 6¾*d.*
240 lbs. tar, at 1·116s. per 100 lbs.	2 8
105 lbs. ammonia water, at 0·669s. per 100 lbs.	0 7
1460 lbs. coke, at 4½d. per 100 lbs.	5 5¾
So that this cannel would be worth	21 3½

when the cannel which produced 10,875 cubic feet of 24·25-candle gas was selling at 30s. delivered.

And when the cannel producing 10,875 cubic feet was selling for 35s., and the coal producing 10,665 cubic feet was selling at the same price (20s.), this cannel, producing 9676 cubic feet, would be worth 1s. 11½d. more than 21s. 3¾d. = 23s. 3d.*

For 196·42 − 152·5 = 43·92
And 263·71 − 152·5 = 111·31

So that if 111·31 cost 5s., 43·9 would be worth 1s. 11½d.

We have now arrived at results from which we shall be enabled to obtain an easier method of finding these comparative values; but, before we attempt to summarize the principles of valuation we have already endeavoured to examine, it will be well to ascertain how, or in what manner, the value of a coal or cannel may be affected by the quality and quantity of coke it produces, and what relation the production per ton bears to the commercial value of the coke produced, as also how an increased or diminished production of this valuable secondary product would affect the commercial value of gas coals and cannels.

(*To be continued.*)

Reductions in the Price of Gas.—The directors of the Portobello Gas Company have given notice to their consumers that from and after the ensuing survey of meters, the price of gas will be reduced from 6s. 8d. to 6s. 3d. per 1000 cubic feet. A similar notice has been issued by the Musselburgh and Portobello Gas Company. The Burton-on-Trent Commissioners have resolved to reduce the price of gas from 4s. to 3s. 6d. per 1000 cubic feet until the 31st of December next. The directors of the Bideford Company have reduced the price from 5s. 6d. to 5s. from Michaelmas. The Burnley Town Council, at their meeting on Wednesday last, decided upon a reduction from 3s. 8d. to 3s.

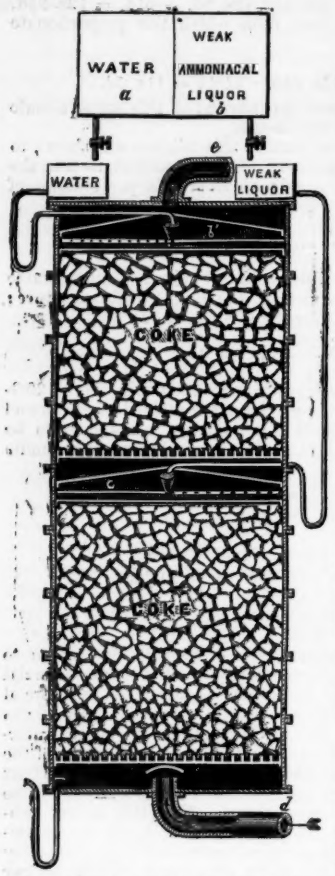
* We would not have it be understood that this cannel was not worth *more* than 23s. 3d.; as, if *screened*, it produces 10,190 cubic feet; but the sample selected for comparison was *unscreened* cannel.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

XXXIV.

The Scrubber.

The annexed engraving represents the scrubber described by George Lowe, in the specification of his patent referred to, as follows:—"The figure shows a section of the apparatus, which I propose to make into two compartments, so that weak ammoniacal liquor may be used in the lower one, and water, or water acidulated with sulphuric or muriatic acid, in the other. The two compartments of the apparatus are nearly filled with lumps of coke, as has before been done in constructing what is called the 'scrubber;' and my improvements consist in distributing the purifying fluid used; *a* is a tank of water, or it might be other purifying liquid; *b* is a tank for weak ammoniacal liquor; b^1 and *c* are two perforated pipes on axes, the perforations on either side of the axes of each pipe being on opposite sides, so that the flow of liquid in stream will cause the tubes to revolve on their axes, and distribute the fluid equally on the coke. The gas rising upwards from its pipe of introduction at *d*, passes off partially purified from ammonia by the pipe *e*, and it is the use of the revolving pipes, b^1 and *c*, which constitutes the novelty of apparatus."



Since this description was given, the scrubber has undergone but slight alteration; its application, however, has been greatly extended, in such a manner as not only "partially" but effectually to purify the gas from ammonia, and, further, to retain the impurity as a valuable residual, rendering it an important source of profit in all well-directed establishments.

To Mr. Mann, late of the City of London Company, the gas world is greatly indebted for the manner in which he has devoted himself to the application of the scrubber, and the results obtained therefrom. The material alterations introduced by this gentleman consist in applying motive power for the supply of liquid, thus avoiding the uncertainty of action which existed in the Barker's mill, patented by Lowe, as above described; also in the mode of spreading the water over the area of the vessel by revolving brushwood distributors, and the means of clearing out the obstructions of the holes in the pipes when the scrubber is in action, which obstructions were frequent causes of irregularity in the operation of the machine.

At the City of London Company's works, of which Mr. Mann was engineer, there are five scrubbers, each about 28 feet high and 12 feet diameter, having three tiers of coke, each about 8 feet deep. Into these the gas, as produced, is equally divided, thus rendering them separate and distinct purifiers, water being admitted at the tops of them in the proportion of 10 gallons per ton of coal carbonized (the liquor from the condenser not being employed), and descending through the interstices of the coke, gradually absorbing the ammonia. The crude gas, entering at the bottom in a manner similar to Lowe's process, meets with the most concentrated liquor, and, at the upper tier, comes in contact with clean water, by which means the whole of the ammonia is eliminated.*

The strength of the liquor in its passage is rather remarkable, for when drawn from the first tier it is only "half ounce;" from the second tier it is 2½ ounces, and as it issues from the bottom it is increased to 14 ounces strength. From this we learn that the crude gas in entering the scrubber is rapidly deprived of the greater portion of its ammonia, as 11 parts out of the 14 are there retained, whilst only a very small portion is abstracted in the upper tier. As ammonia is rapidly absorbed by clean water, the inference is that, under such conditions, this impurity must be entirely removed.

The liquor obtained from the scrubbers is mixed with the weaker liquor from the condensers, and thus the quantity produced for sale is about 20 gallons of 10-ounce strength per ton of coal carbonized.

The success of Mann's scrubber seems to depend more particularly on its large cubical capacity, there being upwards of 100 cubic feet for a maximum production of 1000 feet of gas per hour. Consequently, in addition to the gas being subdivided, so that each of its particles is brought into contact with the liquid, by this large capacity of the scrubber, the gas is retained therein in a state of comparative repose for a considerable time, as about ten minutes are required for its passage through the vessel, and thus sufficient opportunity is given to the liquid to absorb the ammonia. The best scrubber is evidently that which eliminates the whole of the ammonia with the smallest quantity of water (particularly when the ammonia is to be manufactured into sulphate on the premises where it is produced), and, for this purpose, the gas and liquid must be caused to come repeatedly in contact in the most minute particles, and the operation conducted in such a manner that the liquid shall have sufficient time to absorb the ammonia.

The action of the washer is directly the opposite of this, for, in washing, the gas passes rapidly through the liquid in globules of varied capacity according to the size of the orifices through which it issues. The action is thus too quick for the water to be effective, whilst the gas forming the interior of each globule is beyond the influence of the liquid. Hence the difficulty of removing ammonia by the washer.

As we are now on the question of washers, we may state that it is worthy the attention of engineers to attempt to remove the sulphur compounds by a washer especially provided for that purpose, by which the liquid is speedily converted into a strong solution of the sulphide of ammonium. The vessel employed should be of large area, with the dash-board of wood, and the holes therein as small and as numerous as possible; but, for practical purposes, it would not be advisable to make them less than half an inch in diameter. We believe that this will be found the most effective and cheapest method of getting rid of these troublesome impurities, possessing as it does the further advantage that the longer it is in action (within reasonable limits—say for six months) the more effective will be the operation.

An improvement in the apparatus under consideration has been introduced by Mr. George Livesey, which consists in substituting thin boards within the scrubbers instead of the coke or other porous material. This arrangement he describes as follows:—"The boards are cut from deals or planks, 9 or 11 inches wide, 3 inches thick, with nine deep cuts dividing them into ten thin boards, each about a quarter of an inch thick. The small upright blocks which are nailed between the boards, to keep them a proper distance apart, are one inch by half an inch, while to keep each tier separate from those above and below it, and to serve also as sleepers or joists, I use pieces 1½ or 2 inches square. With this plan care must be taken to prevent the gas going up all in one place, and to attain this I fix a sort of inverted trough made of 1¼-inch boards which covers the inlet and extends across the bottom of the scrubber. The gas escapes from this trough, through a number of small apertures in its sides, and is thus distributed with sufficient uniformity. . . . The fitting of the boards is now proceeded with. The first tier is laid on the bottom of the sieves which used to carry the coke, and tier above tier is fitted until the vessel is nearly half filled; a space is then left of about 2 feet 6 inches, when another succession of tiers is laid, which fill the remaining half, and on the top is placed a coarse cocoa-nut matting to spread the water."

Mr. Livesey's mode of operation is to pass the gas through three scrubbers, the first two (as the gas enters) being supplied with the liquid derived from the last scrubber, as well as that from the condensers; by this means the greater portion of the ammonia is absorbed by the liquor in these vessels, which attains the desired strength of 10 or 11 ounces, and by allowing from 5 to 6 gallons of water per ton of coal carbonized, to pass into the last scrubber, the rest of the ammonia is entirely removed. On the occasion of giving the particulars of his method of scrubbing, Mr. Livesey did not state the quantity of liquid sold per ton of coal, but, with his known intelligence, we are assured that his operations cannot be much inferior to those of Mr. Mann.

In other large works, sometimes four scrubbers are employed, the last, at the exit of the gas, being supplied with clean water, which, in descending, absorbs a portion of the ammonia. The liquid from this is then pumped into the next scrubber, and so on to the first, where the crude gas enters. Thus, at each vessel, the liquor becomes more concentrated, somewhat in the proportion effected in the divisions of Mann's scrubber. If, by any means, this is not of sufficient strength, the liquor is again pumped into the scrubbers receiving the foul gas, until attaining the quality desired.

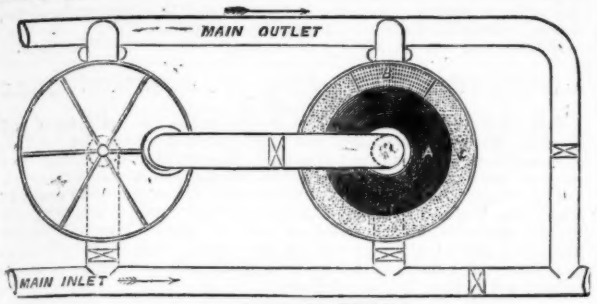
Amongst other methods of supplying the scrubber with water, Mr. Anderson has adopted tumbling vessels, each of which receives its supply of water, then tilts or tumbles over, the liquid being spread by suitable means. He further has the means of controlling the liquid according to the quantity of gas produced. A jet of steam has been admitted at the top, but as this increased the temperature of the liquid, and thus diminished its absorbing powers, it was in consequence abandoned. Another means consists in causing a jet of water under high pressure to impinge on a solid surface, so as to produce a spray; but this does not deliver the liquid with the regularity desired, and has not been generally applied. We very recently described the method proposed by Messrs. Pélouze and Audouin, which deserves attention.

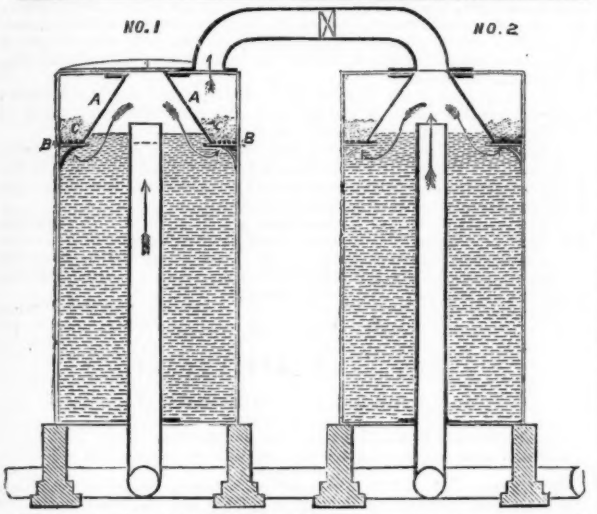
The accompanying engraving represents an arrangement of washer and scrubber combined, as erected at the Western Gas-Works by Mr. L. W. Pritchard.

This apparatus (of which two are shown in conjunction) consists of an outer vessel or tank, having an inverted bell, A A, open at top and bottom, bolted and tightly jointed to the top, and supported by brackets fixed to the side of the tank. At the lower part of the bell is a grating, B B, occupying the annular space comprised between the bell and tank, for supporting the filtering-bed or scrubbing material,

* This apparatus was described and illustrated in Journals Nos. 403, 465, and 484.

C C, which, by preference, on account of its specific gravity, is composed of clinkers. The inlet-pipe is placed at the centre of the vessel, and extends a short distance above the water level. The tank being filled with water or liquor to such a height as will seal the mouth of the bell about one-half or one inch, the gas on entering the bell forces its way through the liquid, and the spray arising therefrom constantly saturates the scrubbing material. The simplicity of the arrangement is apparent, and Mr. Pritchard speaks highly of its efficiency, but we are not able to furnish any account of the results.





We have referred to the breeze-box, and, as this arrangement is unknown to many of our readers, we give a sketch of the apparatus. Fig. 1 is an elevation: *a* is the clearing-out door, *b* is the inlet-pipe, and *c* the outlet; *d* is a pedestal to raise the vessel to the desired height, so as to discharge its contents into barrows; *e* is a man-hole

FIG. 1

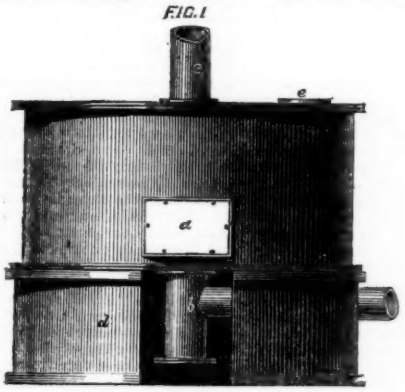
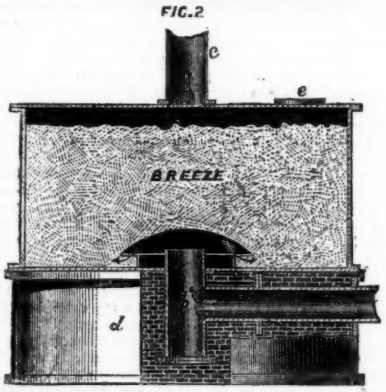


FIG. 2



for filling the "box" with breeze. Fig. 2 is a section of the same, showing the inlet-pipe, projecting some distance above the base, in order to prevent the breeze entering therein, and it is further shielded by a domed cover, supported on stands. Around the shield are placed large pieces of hard coke, so as to prevent that part being clogged up with the tar; against this is a portion of coke of smaller size, and the vessel is filled with breeze, and the door or man-hole being fixed, it is ready for use. Should the breeze by any chance fall into the pipe *b*, it can be removed by taking off the flange at bottom. When the breeze-box arrangement is employed, it is necessary to have two of them, so that one can be used whilst the other is being cleansed. The pressure-gauge will indicate when this is necessary.

Dry scrubbers, similar in construction to the wet scrubber, but not supplied with liquid, have also been employed at various gas-works, generally where water has not been easily procurable. They are, however, of comparatively little service, as by their action only a portion of the tar is removed without any material action in the ammonia. For successful operation, the ammonia should be removed, and retained alike for the benefit of the company and the consumer.

In many works only one scrubber exists, and this often of such limited capacity as to be utterly unfit for the purpose. Having in view the large return, therefore, to be derived from the ammonia in all such cases, no time should be lost in making the necessary alterations, so as to profit by this material; and as the demands for it increase yearly, there is little fear of the market being glutted. Only a few years ago, hundreds of thousands of pounds were expended annually to procure guano, the most valuable ingredient in which is ammonia, from the most distant parts of the world, yet, at the same time, material identical with this was literally thrown away from nearly every gas-works in the kingdom. Some important changes have been made in this direction since then, but there is much room yet for improvement, and gas engineers and managers, in the interest of those they represent, should give the subject due attention.

Hence we find that for successful operation, it is not only necessary to remove the ammonia, but also to retain it as an article of commercial value, and for this purpose the strength of the liquor from the scrubbers and condensers becomes the first consideration; for, if it contain but a limited quantity of ammonia, say only of 2-ounce strength, it is almost worthless for transportation for manufacturing purposes, but when of 10-ounce strength, which is that generally stipulated for by purchasers, it possesses value, its price averaging about 8s. or 9s. a butt. With strong liquor, less fuel is required, less expense in carriage, and less labour in manufacture.

About one-third of the ammonia is retained in the liquor of the condenser; the other remains with the gas, and should be removed by the scrubber; and when this is successfully accomplished, under ordinary circumstances, this, together with the liquor derived from the condenser, will realize about 1s. per ton of coal carbonized.

For the purpose of ascertaining the quantity of ammonia held in solution in gas liquor, the hydrometer of Twaddel is usually employed, each degree indicated by it being about equal to "two-ounce" liquor—that is, a gallon of such liquid would require two ounces of sulphuric acid (sp. gr. 1845) to neutralize it. Thus, 5° Twaddel is 10-ounce liquor.

This method, however, is liable to serious error, on account of the presence of carbonic acid, which is absorbed by the ammonia; therefore, more reliable and accurate means are required, and, for this purpose, we give the instructions of the late Mr. Bannister. The great facilities for procuring the apparatus, test liquor, &c., are a further recommendation to the system:—

"The strength of the ammoniacal liquor is generally determined in the following manner:—The value of the liquid depends on the quantity of commercial salt it is capable of producing; and in order to ascertain this, sulphuric acid is mixed with a given quantity of liquor till the solution is neutral, which is known by its not reddening blue litmus paper. The test-acid employed is called 'the 10 per cent. acid,' and is prepared in the following manner:—One pound of sulphuric acid (sp. gr. 1845) is mixed with water till the solution measures exactly one gallon, the specific gravity of which will be found to be 1068·2.

"If, now, a glass vessel, divided into sixteen exactly equal parts, and graduated accordingly, be filled with this test solution, each division will represent one-sixteenth of a pound, or one ounce of sulphuric acid. Such an instrument as this is called an alkalimeter,* and is represented on the adjoining figure. Fill the alkalimeter to the line marked zero with the ammoniacal liquor to be investigated, then pour it into a dish, and with a very small quantity of water wash out the instrument, and pour the washings into the dish with the other. Now fill with the test-acid to zero, and pour gently into the dish, carefully stirring up the mixture at the same time with a glass rod. Note the point of saturation, which will be ascertained by the mixture slightly reddening litmus paper. Read off the number of divisions or ounces of test-acid poured off from the alkalimeter, say six ounces or divisions, and this will represent the strength of the liquor, which will be called '6-ounce liquor' accordingly; a gallon of this containing that quantity of ammonia in solution."

It must be here remarked that the degrees of Twaddel simply indicate gravity; and supposing we have an average solution of free ammonia, carbonate of ammonia, and sulphide of ammonium, the indications of the Twaddel hydrometer, in relation to the acid test, are sufficiently accurate. But in some cases, and particularly when a fresh scrubber is started, more

* The alkalimeter, with test acid and all the requisite apparatus for the operation, are to be obtained from Messrs. A. Wright and Co., Millbank Street, Westminster, at a cost of a few shillings.

fixed compounds of ammonia are formed, such as sulphate, cyanate, and sulpho-cyanate, in addition to which the ammoniacal liquor contains hydrochloric acid, and in that case the indications of the hydrometer and the acid test do not agree. In such cases the actual quantity of ammonia must be determined by a chemical analysis to be described hereafter.

A correspondent (Mr. Leicester Greville) has, through these columns, recently called the attention of gas companies to the loss arising from the imperfect method generally adopted in ascertaining the quantity of ammonia in the liquor, and, according to experiments made by that gentleman, over and above the ammonia indicated by the standard acid, and by the amount of which the liquor is usually valued, there is present a quantity in the fixed state, varying from 8·4 to 66·2 per cent. in proportion to the indicated ammonia.

(*To be continued.*)

Correspondence.

RELATIVE PRICE OF COMMERCIAL & CHARTERED GAS.

SIR,—The chairman of the Commercial Gas Company, who is also a member of the Metropolitan Board and the vestry of his parish—with what object it is difficult to see, unless to make a little local parochial capital—whilst speaking to his shareholders on the 2nd inst., after lauding the management of the affairs of his company, takes the opportunity of casting discredit upon the companies, who, whilst compelled to work under the stringent provisions of the City of London Gas Act, have found it necessary to avail themselves of the "revision clauses."

He also refers to that Act as if it had not been beneficial to the consumers, although from 1868 to 1872 it secured to them gas of four candles higher illuminating power than the Commercial Company are bound to supply, at 3d. per 1000 feet less than that company have been charging. Taking the light given (which is what the consumer pays for), the relative cost is as follows:—

Per Candle, Commercial Company, 4s. per 1000.	Per Candle, Chartered Co., 1869 to 1872, 3s. 9d. per 1000.	Per Candle, Chartered Co., 1873, 4s. 4d. per 1000.	Per Candle, Chartered Co., 1874, 5s. per 1000.
4d.	2·81d.	3·25d.	3·75d.

He stated that they have been supplying gas of a higher illuminating power than the standard; so also have the Imperial and Chartered Companies, as proved by the published reports of the gas examiners.

This being so, I think he has little cause to boast of their study of the consumers as being of much value to them.

It is sad to hear one of the directors of a metropolitan gas company gratuitously going out of his way to cast a stigma upon another company, with such an evident ignorance of the whole question as is displayed in his remarks, and he certainly is not studying the interest of his own proprietors in doing so; for, whatever may be the future of gas interests, his company, with all others in the metropolis, will be sharers in it.

Oct. 7, 1874. JUSTICE.

PELOUZE AND AUDOUIN'S LAST PATENT.

SIR,—I fancy that there is some obscurity in the description of "Pélouze and Audouin's Process for Eliminating the Soluble Principles contained in Gases and Vapours" (JOURNAL OF GAS LIGHTING, Sept. 29th). Many sorts of apparatus are mentioned, including "furze" and coke scrubbers; also distributing arrangements, some of which are said to "have in certain cases produced good results, but they all occupy considerable space, and, besides being very expensive to work, necessitate the employment of an amount of liquid entirely out of proportion to the results obtained."

Now, sir, am I to understand that gas can be compressed so as to give a pressure equal to three or four atmospheres, and that water can be pumped into vessels under a similar load, without an expenditure of power far greater than we have any knowledge of in connexion with the working of apparatus that is at present doing all that this ingenious contrivance is laid out for, or am I mistaking the whole affair? Again: "The number of the jets will vary according to the size of the works, one jet being sufficient to produce a permanent column of mist of from 24 to 32 inches in diameter, and from 10 to 13 feet in height, at the rate per hour of two gallons of liquid, mixing with 35 cubic feet of gas introduced under pressure." Does this mean two gallons of liquid (say water) for every 35 cubic feet of gas made? If so, there would be a tremendous quantity of water to pump for the water treatment of the gas, where the make is at the rate of 300,000 feet per hour, compared with what is now required for a similar purpose. If all this can be done without an expenditure of great power, I am in error, and will thank any one who will set me right.

Dorset Street, Blackfriars, Oct. 9, 1874. W. MANN.

[We simply transcribed the specification, which gives no information on the points mentioned by our correspondent.—ED. J. G. L.]

DETERMINATION OF THE STRENGTH OF AMMONIACAL LIQUOR.

SIR,—Can you assist me in explaining more clearly the relation between the usual standard adopted in practical work to find the strength of ammoniacal liquor and the real per centage of ammonia it contains? Twaddel's hydrometer, as the readiest, is also the most frequently used gauge of gas liquor, and large contracts are often made upon this basis. Yet it seems grounded on a strange anomaly; for while water saturated with pure ammonia is lighter in proportion to the quantity it contains, yet in using Twaddel the liquid is valued in proportion to its increased specific gravity. As this cannot be ascribed to the ammonia, it must be due to the impurities removed in scrubbing the gas.

We, therefore, sell or buy the liquid on the basis, not of the ammonia, but of the accompanying impurities, and assume, what no doubt is often true, that these impurities are accompanied by a relative quantity of ammonia.

It must be admitted that this is not a satisfactory test, for not only are the impurities sometimes unduly large, but it seems to be generally thought amongst many practical men that the hydrometer is an actual gauge of ammonia. No doubt that the neutralizing by acid is a much more scientific method, and one to which reference should be made in all cases of doubt.

Plymouth, Oct. 4, 1874. WM. HARVEY.

[This matter will shortly be treated of at some length.—ED. J. G. L.]

THE SULPHUR MAXIMUM FOR LONDON.

SIR,—Having reference to your notice of the instructions of the gas referees for the winter half year, allow me to point out that although, as you correctly state, the maximum for urban works remains 25 grains, this really involves a reduction; as, on account of the larger make of gas, it has formerly for the winter months been 30 grains.

Westminster, Oct. 10, 1874. WM. POLE.

MANUFACTURE OF SULPHATE OF AMMONIA IN SMALL GAS-WORKS.

SIR,—Having read with pleasure the "Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas" which appeared in your issue of the 6th inst., I take the liberty of calling your readers attention to that portion of the treatise which states "that the manufacture of the compounds of ammonia is not restricted to works of magnitude, but may be adopted in those of very limited capacity, and that the operation may be carried on with advantage at establishments producing only 20 million feet of gas per annum," and, in reply, I beg to show that the manufacture may be adopted with advantage in much smaller works than therein referred to.

For example, the Bodmin Gas-Works (of which I am manager), producing under 6 millions per annum, introduced this manufacture last year at a cost of about £60, and produced during the year over 3½ tons of sulphate of ammonia, which realized a clear profit of £45, after paying for acid and labour £20.

In consequence of the liquor made in the summer being insufficient to keep the apparatus at work during that season, it was stored in tanks till Michaelmas, when the manufacture was commenced.

I recommenced to manufacture last Monday, and up to the present time have made 8 cwt. of sulphate, and believe I shall be able, with the improvement made in the condensers and scrubber last summer, to make from 7 to 8 cwt. weekly up to next Lady-day.

I trust you will excuse my troubling you to publish this, my object not being to criticize or to find fault with the treatise, but with the view of extending the benefit of such useful manufacture, and to show that works not one-third the size referred to in the treatise may with advantage turn the matter to a profitable account.

Gas-Works, Bodmin, Oct. 10, 1874. JAMES THOMAS.

Legal Intelligence.

THE RAILWAY COMMISSION.

TUESDAY, OCT. 6.

(*Sir* FREDERIC PEEL, *Chairman; Mr.* MACNAMARA, *and Mr.* PRICE.)

NITSHILL AND LESMAHAGOW COAL COMPANY *v.* CALEDONIAN RAILWAY COMPANY.

Mr. LITTLER, Q.C., and Mr. SHIRESS WILL appeared for the complainants; the SOLICITOR-GENERAL (Sir John Holker, Q.C.) and Mr. PEMBER, Q.C., for the defendants.

This was a complaint against the railway company for alleged undue preference to certain collieries in Lanarkshire, in the conveyance of coal over the defendants railway, to the prejudice of the complainants.

Mr. LITTLER, in opening the case, said the complainants were a company trading at the Southfield Colliery, Lanarkshire, under the title of the Nitshill and Lesmahagow Coal Company. Near them were two other collieries—the Longlea, belonging to Messrs. Thornton and Co., and the Auldton, which was the property of Mr. Spencer. There was also a third, belonging to the Haywood Coal Company, in work near Wilsontown, in the same county. All four were in the habit of sending their coal over the defendants line to Granton and other Scotch ports for shipment to all parts of the world, and the complaint was that an undue preference was shown in the rates charged to the Longlea, Auldton, and Haywood Companies as against those at which the complainants were assessed. The different rates, as entered in the application, were as follow:—From Southfield, which is 57 miles from Granton, the rate was 5s. 1½d. per ton per mile; from Longlea, distant 54 miles, 3s. 10½d.; from Auldton, 52 miles off, 3s. 10½d.; and from Haywood, only 26 miles off, 1s. 9d. It was further alleged that the rates allowed to the three last-named collieries to other places than Granton would show the same disproportion, and it was believed that an undue preference was given in the same way to other collieries than those mentioned; but on that head the complainants were unable to furnish evidence. The defendants denied *in toto* the charge of undue preference. They were the owners of lines from Carlisle, to Aberdeen, Edinburgh, Leith, and Granton, and one branch of their line—the Lesmahagow branch—ran from near Motherwell to Bankend, in the parish of Lesmahagow, where the complainants pits were situated. Some time ago this branch had been doubled at considerable expense for this particular traffic, and worked ever since at considerable expense, as the route to Granton was over very steep gradients—so steep, in fact, that the trains on that line had been reduced to 15 waggons. All the coal traffic on their line was divided into two classes, common coal and gas coal, and higher rates were charged for the latter as being more valuable. The complainants practically only raised gas coal, and were charged the same rates as was the Longlea Company, which was the only other of the companies mentioned which raised the same coal. For the common coal the Longlea proprietors were charged lower rates, and it would seem as though the complainants had compared the rates at which they were charged for the carrying of gas coal with these lower rates. The defendants also owned another branch line of railway, called the Wilsontown branch, leading to another mineral field in a different district. The gas coal raised there was of an inferior quality, being only worth 30s. per ton, whereas the Lesmahagow coal was valued at from 40s. to 45s. per ton, and the Wilsontown coal was in consequence carried at lower rates than the Lesmahagow coal. The Wilsontown route, too, was a far easier one, and, moreover, there was a competition in the neighbourhood, the North British Railway Company having a branch line near the same place. The Haywood Company, said the defendants, was charged 2s., not 1s. 9d. per ton, as stated by the complainants, and raised but very little gas coal, having only sent off 280 tons this year; whereas in the same time the complainants company had raised 10,800 tons. To all the other collieries the rates were assessed on the same proportion, but practically no gas coal is sent from them to Granton, and that which is sent from Wilsontown cannot be said to compete with the Lesmahagow produce. Further, the defendants stated that they did not know what other collieries were alluded to concerning which evidence could not be procured, but they did not believe any such existed, and they totally and finally denied the charge of undue preference. For the complainants it was contended that no railway company

had power to make any such arbitrary distinction in traffic as this classification of coal. Coal was coal, so far as the railway companies were concerned, wherever it came from, and without any regard to its value, and he (Mr. Littler) quoted the Act under which the defendants company held their powers in support of his argument. He admitted that the Wilsontown route was to a certain extent the easier of the two, but not to a degree to justify the disproportion of the rates; the worst gradient on the Lesmahagow line was 1 in 65, the worst on the Wilsontown line being 1 in 100. He denied that his clients were the only raisers of gas coal in Lanarkshire, and said that he should call witnesses to prove that coal of a similar nature was raised from other pits in the district, and enabled to compete on unfair terms in the market with the produce of his clients in consequence of the disproportionate rates at which the latter were assessed. Under the circumstances stated, the complainants having applied to the railway company, who refused to alter their rates, now asked the commissioners to grant an injunction to compel the defendants to desist from giving undue preference to other parties, to the prejudice and disadvantage of their business.

Mr. *James Lancaster*, manager of the complainants company, deposed that their annual output averaged 57,000 tons. No coal was worked in Lanarkshire but gas coal—what was known in England as cannel coal. Witness's company shipped their coal to London, Glasgow, and other places. Continual complaints had been made to the railway company of the rates charged, but they were always treated in a cavalier manner. In reference to the allegation that the gradients prevented more than 15 waggons being dragged by one engine, witness stated that they commonly started 30 or 33 waggons in a train, the latter number being the limit given to the men; the fact of another engine being attached at Ross Side applied to all the traffic. Witness said the company had a ready sale for all the coal they could raise, and they were now sinking two more pits.

In cross-examination, *witness* said there was very little common coal raised at his collieries; it was principally cannel coal. A long correspondence had ensued between his company and the Caledonian with reference to the high rate that was being charged, but no complaint was made as to the low rate given to the Haywood Company. Thornton and Spencer's collieries, which were in the same district, were charged the same price as the complainants for the carriage of cannel coal.

Mr. *Horatio Brothers*, engineer of The Gaslight and Coke Company (western division), London, said his company had for many years consumed large quantities of coal from the Lesmahagow collieries; they also used splint coal from the Haywood collieries. He also considered the splint coal to be virtually a coal competing with the cannel or gas coal. He was the only person in London who had used the Haywood coal, and considered it a formidable rival to the Lesmahagow gas coal. The Yorkshire coal was most like the splint coal, but was inferior in coke.

Dr. *William Wallace* (gas examiner for the city of Glasgow) said he was largely engaged testing coals for gas purposes, under instructions from the corporation. The Lesmahagow coal he considered the highest-class coal for gas purposes, the Haywood cannel was inferior. Some splint coals were superior to the lowest class of cannel. The Haywood splint was superior to common coal, both for production of gas and leave of coke. The splint coal was a modification of the cannel—that was to say, that it was impossible to say where the cannel ended and the splint began. There was no exact English equivalent to splint coal, which had only just begun to be used in England, and, where used, was undoubtedly a rival to cannel coal. Until within a few years ago splint was generally used in iron-works, but its value having become recognized, it was now used almost entirely for gas-making purposes. Splint coal was named from the fact of its having a splitting fracture; instead of breaking in pieces as common coal would do if struck, it split into slate-like pieces.

This closed the complainants case.

WEDNESDAY, OCT. 7.

The SOLICITOR-GENERAL opened the case for the defendants. He said he would deal first with the point of law raised by Mr. Littler as to the power of the railway companies to charge different rates for the different classes of coal, with regard to which he remarked that should the court accept such a reading of the Act, it would necessitate a complete revolution in the entire scale of railway rates. It had been allowed, the learned gentleman went on to say, by the other side, that a railway company might make a distinction in the case of coke, or charcoal, or cinders, as distinguished from coal; but they said that all coal, no matter what its value, was to be placed in one and the same category, so that the commonest kind, such as "slack," known generally as "dross" in Scotland, was to be rated on the same scale as the most valuable. But if this argument held good, it would apply equally to all other kinds of traffic—the rarest and most expensive marble, for instance, would have to be carried at an equally low rate with the coarsest and cheapest stone, fire-bricks or glazed tiles with the commonest building bricks. Railway companies, as carriers, were also to be regarded to a certain extent as insurers, and when any article was lost or injured, through, it might be, the negligence of their servants, they were responsible to the owners; and so, following the theory adopted by the complainants counsel, the same penalty would be exacted in the case of the cheapest as of the most expensive goods. Valuable goods would bear high rates, but such goods as common coal would not. It would, however, be found that if Mr. Littler's theory was held the true one, the present differential rates would all have to be brought to one maximum standard. The Act at present allowed the railway companies, where dealing as common carriers, to impose what rates they pleased, provided only they were reasonable; when they did not so deal, even that provision was, in effect, removed. By the Railway and Canal Traffic Act the companies powers had to a certain extent been restricted, but only so far as it compelled them to deal with everybody similarly circumstanced in the same way. This, he contended, his clients had done with the complainants. Their high rates were not objected to *per se*, and the rates charged to other producers for a comparatively similar coal were to be judged by the surrounding circumstances. Thus, the Lesmahagow branch line had not only cost far more in original outlay than the Wilsontown branch, but was worked at a far heavier expense. A great deal of evidence had been taken to prove that a similar coal to that raised by the complainants was, in effect, raised from other pits and conveyed over the same line. But in reality this question was one to be very easily and simply settled by the relative prices, and it was obvious that that which cost 40s. at the pit mouth could not be the same as that which cost but 7s. or 8s., as did the common coal, or even that which brought 30s., as did the Haywood "cannel coal." Again, in all cases of undue preference, it was a necessity under the Act that the complainant should show that he was aggrieved by the alleged preference. It had been shown by Mr. Lancaster that the coal raised from the Southfield Colliery brought 40s. at the pit mouth, and was sold in Granton for the same price *plus* the carriage rate. If that rate were lowered, the complainants would not in any way profit. They would still get the same price at the pit mouth *plus*, in Granton, the reduced rate, which, as before, would go into the defendants pockets. Consequently, though the defendants would lose, the complainants would in no way gain. His learned friend was asking the court to legislate and impose restrictions upon the Caledonian Company which had not been imposed upon them by the Act of Parliament. If this injunction were granted, it would compel the company to revise the whole of its rates.

Sir F. PEEL: We cannot grant an injunction because any special Act of Parliament has been infringed. We administer the Railway and Canal Traffic Act of 1854, and it must be shown that the Caledonian Company have infringed that Act.

Mr. LITTLER: I contend that there has been an infringement of that Act.

The SOLICITOR-GENERAL said all that his learned friend had endeavoured to show was that the Caledonian Company had exceeded their powers, and had charged a higher rate than they were entitled to do, but that was not an infringement of the Act of 1854.

The SOLICITOR-GENERAL said the complainants next contention was that the mines in the Wilsontown district had an undue preference as compared with those in the Lesmahagow district. He admitted that the two districts were not treated on the same terms, but the reasons for that being so were these: the circumstances of the two districts were entirely different. The cannel coal of the Wilsontown district was a much inferior article to that of the Lesmahagow district. He believed it could be bought for 10s. a ton less than the cannel coal of Lesmahagow. Then another reason was that the cost of the making and working the Lesmahagow branch had been very much more than the Wilsontown branch. The Solicitor-General concluded by contending that the complainants had not made out any real case of grievance; but if they had, he considered the circumstances of the case justified what the Caledonian Company had done.

Mr. *J. Thomson*, goods manager of the defendants railway, and Mr. *T. Hawksley*, C.E., were called as witnesses in support of the defence.

The SOLICITOR-GENERAL briefly summed up the case, recapitulating all the arguments that had been advanced on either side, and again calling the attention of the court to the fact that the complainants could not be said to be aggrieved parties, inasmuch as they could, and always had, sold all their output.

Mr. LITTLER having replied,

The COURT said that they should take time to consider their judgment, due notice of which would be given to both parties.

BARNSTAPLE QUARTER SESSION.—WEDNESDAY, OCT. 7.

(*Before* C. J. MURCH, *Esq.*, *Recorder.*)

OVERSEERS OF BARNSTAPLE *v.* THE BARNSTAPLE GAS COMPANY.

Mr. SPARKES appeared for the appellants, and Mr. THORNE for the respondents.

The appeal was against an order made by the borough magistrates in special session, under the 6th section of the 6th and 7th Wm. IV., cap. 96, by which the rateable value of the Barnstaple Gas-Works was reduced from £356 to £17 18s. 1d.; and the amount of rate payable on the property, at the rate of 2s. 4d. in the pound, was reduced from £41 10s. 8d. to £2 1s. 9d. The grounds of the appeal against this order of the magistrates were (1) that the court of special sessions had no jurisdiction in the matter; (2) that the quarter session was the proper court to come to; (3) that the acting magistrates, being ratepayers, and therefore interested in the rate and the question at issue, were disqualified; (4) that some of those magistrates were also disqualified by reason of being shareholders in the gas company; and (5) that the order they made was bad on the face of it, because it bore the signatures of only two of the magistrates who decided the case, whereas the Act provides that the order shall be made "by the justices sitting and hearing the appeal"—that was, *all* the justices.

Mr. THORNE opened the case by attacking these grounds of appeal. He quoted the sixth section of the Parochial Assessment Act to prove that the magistrates had power to hear such appeals at special sessions, to be held for the purpose four times a year, and that it, and not the quarter sessions, was the proper appellate court; and with reference to grounds 3 and 4, while he cited cases to show that their interest as ratepayers or shareholders did not disqualify the magistrates, contended that the objection to their acting should have been made before the case was heard by them, instead of which the overseers went fully into the matter, called and cross-examined witnesses, addressed the court by an attorney, and in all other points accepted the jurisdiction of the justices; and this acquiescence in that jurisdiction, he held, amounted to a waiver of any objection it might have been possible to make. It was on this point that the whole case proceeded, it being found that, owing to the bad drafting of the notice of appeal, the case could not be gone into upon its merits—that is, whether the principle upon which the magistrates had reduced the rate as above set forth was right or wrong.

Mr. SPARKES, for the appellants, contended that for Mr. Thorne's argument of a waiver to hold good, it must be shown that the overseers or their solicitors knew at the time of the special session that the magistrates were disqualified. He called the overseers (Messrs. Avery, Habgood, and Goss) and their solicitor (Mr. Brombam), who all said that though they considered it an improper thing for the magistrates, being shareholders, to adjudicate in what was really their own cause, they were not aware until some time after the decision had been given that they were legally incapacitated from acting. Had they known this fact, they should certainly have raised the objection then, and not acquiesced in the magistrates jurisdiction.

The RECORDER said it was so important a question that he could not give judgment until the January session.

KETTERING COUNTY COURT.—WEDNESDAY, OCT. 7.

(*Before* R. HARRINGTON, *Esq.*, *Judge.*)

KETTERING GAS COMPANY *v.* LEACH.

GAS NOT A NECESSARY OF LIFE.

This was a claim for gas supplied to defendant's wife, the amount being 1s. 6d.

Mr. *Edwin Maddocks*, secretary to the plaintiffs, stated that defendant occupied a house in Montague Street in March, 1870. Defendant had left his wife, and she continued to live in the house. A bill for the debt was sent in on the 30th of March, but it was not paid. He had since seen defendant, once when he was ill, and also when he was out of work, and both times he promised that he would pay.

His HONOUR said his judgment must turn upon the point whether, when defendant left his wife, he was bound to find her in gas as well as sustenance. He gave it as his opinion that it was not so, and therefore the decision must be in favour of defendant.

MANSION HOUSE POLICE COURT.—THURSDAY, OCT. 8.

(*Before the* LORD MAYOR.)

EUPION GAS COMPANY'S SHARES.

Mr. *Joseph Aspinall*, a merchant at 33, Gresham House, City; Mr. *Samuel Gurney Fry*, of 9, Dowgate Hill; and Mr. *George P. Knocker*, of 155, Cannon Street, were summoned at the instance of Mr. John Gamgee, a financial agent at 1, Great Winchester Street, for having in September last, in the City of London, unlawfully conspired with Mr. John Saunders Muir and others to obtain by false and fraudulent pretences, and to acquire to themselves and others on their behalf, various large sums of money, with intent to defraud certain members of the Stock Exchange, and whereby Mr. John Alers Hankey was, in fact, defrauded to the amount of £800 and upwards. Mr. Aspinall alone appeared in answer to the summons, but it was stated that the other defendants, who were absent from London, would be present on a future occasion.

Mr. BESLEY, instructed by Messrs. Abrahams and Roffey, solicitors, appeared for the prosecution; Mr. GEORGE LEWIS, jun., defended Mr. Aspinall, who pleaded "Not guilty."

Mr. BESLEY, in his opening remarks, stated that the defendants, with others,

were the promoters of a company called the "Eupion Fuel and Gas Company, Limited," which was started in March last to work certain patents which the defendant Muir had acquired for producing gas and generating steam. The capital was £50,000, in 50,000 shares of £1 each, and the patents were to be bought for £40,000—namely, £25,000 in cash, and £15,000 in fully paid-up shares of the company. The alleged patents had been conveyed by Muir to the defendant Fry, and then sold by him to the company. Five directors were obtained, the qualification (100 shares each) and the money being found by the defendant Aspinall, who was the mainspring of the concern. On the 7th of April the company applied to the Stock Exchange for a quotation on their official list and for a settling-day, and they furnished documents, under the signature of Knocker, the secretary, showing that the whole 50,000 shares had been allotted—35,000 to the public, and 15,000 to the inventor—and that £34,365 had been subscribed in all. The truth was that the company had never possessed a single *bonâ fide* shareholder, all the shares having been subscribed for nominally by irresponsible clerks and others (65 in all), they not paying a shilling for them, and executing immediately afterwards blank transfers, which they handed over to Aspinall. The bankers of the company were the National Provincial Bank of England, and, in order to strengthen the application to the Stock Exchange, the pass-book was sent in, showing payments in all to the company's credit of about £35,000. That result had been most ingeniously effected. A sum of between £2000 and £3000 was borrowed from the Midland Banking Company, of which Charles Knocker, a brother of the defendant of that name, was the manager, and, being split up so as to represent various shares, was paid into the National Provincial Bank to the credit of the company. It was immediately afterwards drawn out, under the pretence of being deposited at interest with the Midland Bank, and it was then similarly paid in and drawn out again day after day until the requisite sum of £35,000 was made up. Fry, who had 15,000 shares registered in his name, but for which he had previously executed a blank transfer, employed Gamgee, a financial agent, to sell them. Through the medium of several brokers sales were made of about 8000 shares. Before the settling-day they were transferred into the name of the chairman of the company, who refused delivery, in the hope of forcing payment of a higher price. The shares were "bought in" against the brokers, who became liable in consequence for something like a quarter of a million sterling.

After the opening statement, Mr. *G. F. Parratt*, the chairman of the company, was called as a witness, and stated in cross-examination that he joined the company believing the invention to be one of the most sound and valuable inventions of the day. He, however, had never invested any money in the concern, but had been "qualified" by Aspinall.

At the conclusion of witness's evidence, the LORD MAYOR adjourned the case until the 14th inst., accepting bail for the defendant (Aspinall) in £100, and his own recognizance in the same amount.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

THE GAS COMPANIES AND THE METROPOLITAN BOARD.

The following letter has been addressed to the editor of *The Times*:—

Sir,—Your report in *The Times* of to-day of the Metropolitan Board's proceedings on Friday last, on the gas question, omits the most important parts of what I said, hoping to induce the board to stay its proceedings to obtain further powers to become gas-makers for the metropolis.

Personally, I make no objection to the report; but when I consider that the entirely omitted portions of my argument affect the commerce, trade and traffic, and the comfort of the inhabitants through the whole metropolis, including the City of London, I venture to hope that you will allow me very briefly to state why I opposed the order of the Metropolitan Board of July 31, 1874, viz.:—

"That the solicitor be instructed to prepare a bill to be introduced in the next session of Parliament to enable the board to provide an independent supply of gas to the metropolis."

I cited the obstacles in the board's way—

1. The Gas Clauses Act, 1847.
2. The districting powers of the Gas Act, 1860.
3. The amalgamating schemes.
4. The enormous defalcation of Higgs of £70,000, a portion of which was forced into the scheme by the Corporation of London, whereby the metropolitan gas consumers of The Gaslight and Coke Company's gas, out of the City of London, were charged with that portion of the loss.
5. That, supposing Parliament was to undo the gas legislation since 1847, what would be the consequences? An enormous increase of Metropolitan Board debt must immediately be incurred; stations in the metropolis must be purchased, every street, carriage, and footway must be torn up to lay the board's independent mains and service-pipes; while at this moment there is before the board a document showing that their borrowing powers are more than exhausted.

On the other side, in their report, The Gaslight and Coke Company decline the assistance of the Revision Commissioners forced on the metropolitan gas consumers by the City of London Gas Act, 1868; and, without putting the gas consumers to the annual expense of £4000 for the year 1875 (the cost of the Revision Commission), propose to reduce the price of gas, maintaining the same quality and purity of 16 candles, from 5s. per 1000 to 3s. 9d., or 25 per cent.

Then they state that they have so increased their powers of supply by their works at Beckton, Bow, and the extreme western end at Kensal Green (where they are to bring in the Midland and Welsh coal-fields in competition with present supply), that they will be enabled shortly to sell the gas-works in Westminster and Blackfriars, and these two public nuisances, of about eight acres, condemned by Parliament, will be sold, and the proceeds go to redeem, *pro tanto*, the capital of the company, now paying 10 per cent. dividend, and occasion a further reduction of the price of gas from 3s. 9d.

What is the quality and purity of the 16-candle gas, according to the last published report to the Metropolitan Board by Dr. Letheby, dated July 2, 1874? Average, Cannon Street, 16·95 candles; sulphur in 100 cubic feet, 10·74 grains.

For 40 years I have successfully opposed competing lines of gas-mains in the in-wards of the parish of St. George, Hanover Square, and I calculate the inhabitants of that part of the parish pay The Gaslight and Coke Company more than £100,000 per annum. I consider that a 25 per cent. reduction is a boon which, in the language of my rejected motion on Friday, "deserves the support instead of the opposition of the Metropolitan Board."

The majority was 25, about one-half of whom are connected with the City of London. There were 18 absentees, and I am sorry to say there were but myself and the seconder in favour of my motion.—I am, sir, your obedient servant,

JOHN LESLIE, one of the members of the Metropolitan Board for St. George, Hanover Square.

60, *Conduit Street, Hanover Square, Oct. 5.*

METROPOLITAN BOARD OF WORKS.

At the Meeting of the Board on Friday last,

Mr. LESLIE moved—"That a return be prepared of the number of miles of roadways, both carriage-ways and footways, including the parks, within the metropolis as a whole, and also the number of houses on the lines of the double footways." He said that the pocket-book furnished to every member of the board gave them the following information—viz., that there were 75,620 acres, which, divided by 640, gave them 118 square miles. The inhabited houses, according to the census of 1871, were 419,374, and the population 3,265,541. Sir Joseph Bazalgette's figures differed from these. The board had resolved to go to Parliament for power to give an independent supply of gas to the whole metropolis, and he considered that the information he sought to obtain would be of great importance to them in that application. It would be necessary for them to lay before the House of Commons some idea of the cost of carrying out the proposed scheme, and that estimate could not be prepared without the information he now asked for.

Mr. C. LEGG seconded the motion.

Mr. H. L. TAYLOR moved as an amendment—"The previous question," on the ground of the large expense involved in preparing the return asked for, and because he doubted its utility when prepared.

Mr. FREEMAN seconded the amendment, which was put and carried, the mover of the original resolution only voting against it.

Mr. LESLIE then moved—"That an adequate supply of gas from Beckton and Bow for the requirement of the western portion of The Gaslight and Coke Company supplied therefrom can only be obtained through a 4 feet 6 inch main along the Victoria Embankment, and that the company, being bound by statute to give the inhabitant gas consumers an adequate supply, this board do immediately ascertain whether the subway in the Embankment is or not capable of receiving such main, and if not, then the roadway must be the alternative, as the adequate supply is imperative."

The motion was not seconded.

The CLERK read a letter from the Board of Trade, stating that they have decided upon complying with the application of The Gaslight and Coke Company for authority to lay down a new main through the parish of St. George, Hanover Square, and it was ordered to be printed on the minutes, with the correspondence on the subject.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in Marylebone in the months of August and September:—

AUGUST, 1874.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogen.
	*Mean of 16 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Comp.'s gas	15·87	16·70	15·60	23·66	8·45	16·53	0·50	No trace
Chartered Company's common gas	16·37	16·80	15·90	27·73	13·53	10·26	0·30	No trace
Chartered Company's cannel gas	20·80	22·01	20·34	24·21	12·48	16·19	0·16	No trace

Mean of daily readings of barometer . . . 29·81
" " " thermometer . . . 68·30

SEPTEMBER, 1874.	*Mean 18 Obs.							
Imperial Comp.'s gas	16·44	16·91	15·90	20·80	6·30	14·78	0·50	None.
Chartered Company's common gas	16·52	17·24	16·02	28·40	13·50	12·14	0·43	None.
Chartered Company's cannel gas	20·77	21·41	20·30	22·95	12·70	17·78	0·56	None.

Mean of daily readings of barometer . . . 29·76
" " " thermometer . . . 64·90

* Each observation consists of ten readings of the photometer, at intervals of one minute.

During the months of August and September the illuminating power of the three gases consumed in the parish was satisfactory in all respects. In August the mean light of the Imperial gas was equal to very nearly 16 sperm candles; it ranged between 15·60 and 16·70 candles. In September the mean was nearly 16½ candles, and ranged between 15·90 and 16·91 candles. The mean quantity of sulphur in August in 100 cubic feet of this gas was 16·53 grains, and of ammonia half a grain; and in September 14·78 grains of the former, and half a grain of the latter. The Chartered common gas gave a mean light in August equal to 16·37 candles, and in September to 16½ candles; the range in the two months was between 15·90 and 17·24 candles. The mean amount of sulphur found in this gas in August was 10·26 grains, and of ammonia 0·30 of a grain; in September the respective quantities were 12·14 grains and 0·43 of a grain. The cannel gas gave in August and September a mean light equal to nearly 21 candles, the range in the two months was between 20·30 and 22·01 candles. The mean amount of sulphur in August was 16·19 grains, and of ammonia 0·16 of a grain; in September it was 17·78 grains of the former, and 0·56 of a grain of the latter. The pressure of all the gases was generally good, and on no occasion was sulphuretted hydrogen detected in either of them by the ordinary tests. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas manufactured at their works, Beckton and Bow.

METROPOLIS WATER SUPPLY.

Dr. Whitmore's report on the composition of the Thames companies and other waters as supplied in Marylebone during the months of August and September:—

AUGUST, 1874.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by incineration of Solid Matter in previous column.		Hardness before boiling in degrees.	Hardness after boiling in degrees.
	Aug., 1873.	Aug., 1874.	Aug., 1873.	Aug., 1874.		
Distilled Water . . .	0°	0°	0°	0°	0°	0°
West Middlesex water	18·02	16·32	0·82	0·64	11·04	2·70
Grand Junction water	18·64	16·60	0·84	0·68	11·34	2·84
SEPTEMBER, 1874.	Sept., 1873.	Sept., 1874.	Sept., 1873.	Sept., 1874.		
Distilled Water . . .	0°	0°	0°	0°	0°	0°
West Middlesex water	17·20	16·89	0·76	0·72	11·74	2·81
Grand Junction water	18·56	17·84	0·88	0·80	12·12	2·96

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

During the months of August and September the water supplied to the parish by the West Middlesex and Grand Junction Water Companies was clear, bright, and colourless, and perfectly free from taste or smell. Owing to the dry weather of the previous three months, the amount of solid and organic matter contained in it was considerably reduced. The greater purity of the West Middlesex water is due to its more efficient filtration.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of Shareholders was held at the London Tavern on Monday, Oct. 5—THOS. BRIDGE SIMPSON, Esq., in the chair.

The SECRETARY (Mr. G. Livesey) read the notice convening the meeting and the minutes of the last half-yearly meeting, the seal was affixed to the register of shareholders, and the following report and statements of account were presented:—

The directors have again to report that the progress of the company's business has been satisfactory during the half year.

They do not, however, overlook the fact that the amount of profit is short of the sum required to pay the usual dividend; they fully expected as the result of the reduction in the price of gas in 1872, that an inroad would be made upon the surplus fund standing to the credit of the company.

The falling off in the receipts for coke, in connexion with the continued high price of coal, has been the cause of the diminished income, the price realized having been only 11s. per chaldron against 19s. last year, while Newcastle coal though 3s. 6d. per ton lower than in the half year ending December, 1873, cost the company 22s. 5d. per ton, against 22s. 9d. in the corresponding half of last year, whereas in the half year ending June 1871, when coals cost 12s. 6d. per ton, the company received as much as 9s. per chaldron for coke.

The efficiency of the works and mains has been thoroughly maintained. This has involved a considerable expenditure on revenue account for repairs and renewals; while to meet the largely increasing demand for gas, a constant outlay on capital account is required for new plant of all descriptions, which is supplied as found to be necessary. It is satisfactory to state that the profit on the additional business is fully sufficient to pay the dividend on the calls made for this purpose.

The accounts annexed are as usual in the form prescribed by the auditor appointed by the Board of Trade. By reference to the net revenue account, No. 4, it will be seen that after paying the dividend, which amounts to £17,500, out of the fund of £23,579 1s. 3d., available for that purpose, there will still be a considerable sum to carry forward to the next half year in addition to the reserve-fund, which remains intact

No. 1.—STATEMENT OF SHARE CAPITAL *on June* 30, 1874.

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Maximum Dividend authorized.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Amount not paid up.	Total Amount authorized.
5 Vict., cap. 79	Share.	10 per cent.	4,000	£50 0 0	£50 0 0	£200,000 0 0	..	£200,000 0 0
32 & 33 Vict., cap. 130	Share.	10 per cent.	4,000	12 10 0	12 10 0	50,000 0 0	..	50,000 0 0
	Do.	Do.	20,000	12 10 0	5 0 0	100,000 0 0	£150,000 0 0	250,000 0 0
						£350,000 0 0	£150,000 0 0	£500,000 0 0

No. 2.—CAPITAL ACCOUNT.

To Expenditure to Dec. 31, 1873	..	£323,211 17 2	
,, during half year to June 30, 1874—viz.,			
New buildings and machinery in extension of works	£6956 9 10		
New and additional mains and services	6443 0 1		
New and additional meters	481 6 8		
		13,880 16 7	
Total expenditure		£337,092 13 9	
Balance		12,907 6 3	
		£350,000 0 0	

Description of Capital.	Certified to Dec. 31, 1873.	Received since that Date.	Total to June 30, 1874.
By Shares, at £50 each	£200,000 0 0	..	£200,000 0 0
Do., at £12 10s. each	50,000 0 0	..	50,000 0 0
Do., at £12 10s. each, £5 paid	98,975 10 0	£1024 10 0	100,000 0 0
	£348,975 10 0	£1024 10 0	£350,000 0 0

No. 3.—REVENUE ACCOUNT.

To Manufacture of gas—			By Sale of gas—		
Coals, including dues, carriage, unloading and trimming, see Account No. 7	£45,137 19 2		Common gas (per meter) at 3s. per 1000 cubic feet	£50,771 17 5	
Purification, including £539 6s. for labour	1,108 18 8		Less discount	97 2 0	
Salaries of engineer, superintendent, and officers at works	751 17 0			£50,674 15 5	
Wages (carbonizing)	8,412 18 7		Public lighting and under contracts (see statement No. 9)	6,707 1 7	
Repairs and maintenance of works and plant, materials, and labour—less £643 8s. 7d. received for old materials	2,342 16 4				£57,381 17 0
		£57,754 9 9	Residual products—		
Distribution of gas—			Coke, less £920 18s. 2d. for labour and cartage	£14,986 2 7	
Repair, maintenance, and renewal of mains and service-pipes, including labour	£1,824 8 10		Breeze, less £7 3s. 3d. for labour and cartage	475 6 7	
Salaries and wages of officers (including rental clerks)	1,349 11 0		Tar	4,424 9 11	
Repairing and renewals of meters	707 19 11		Ammoniacal liquor	2,984 17 9	
		3,881 19 9			22,870 16 10
Public lamps—			Rents receivable		147 15 0
Lighting and repairing		1,458 7 3	Transfer fees		2 12 6
Rents, rates, and taxes—					
Rents payable	£270 9 4				
Rates and taxes	2,039 14 4				
		2,310 3 8			
Management—					
Directors allowance	£595 0 0				
Salaries of secretary and clerks	700 0 0				
Collectors commission	1,176 3 1				
Stationery and printing	139 18 2				
General charges	422 5 5				
Company's auditors	49 11 8				
		3,082 18 4			
Law and parliamentary charges		Nil.			
Bad debts		356 10 8			
Superannuation-fund		75 12 0			
Gas referees and official auditor		52 9 6			
Total expenditure		£68,972 10 11			
Balance carried to net revenue account, No. 4		11,430 10 5			
		£80,403 1 4	Total receipts		£80,403 1 4

No. 4.—PROFIT AND LOSS (NET REVENUE ACCOUNT).

To Interest on temporary loans	£126 12 4	By Balance from last account	£28,420 10 4
,, deposits	38 19 1	*Less* dividend on ordinary capital for the half year ending Dec. 31, 1873	16,482 18 6
Balance applicable to dividend on ordinary share capital	23,579 1 3		£11,937 11 10
		By Amount from revenue account, No. 3	11,430 10 5
		Interest on moneys on deposit	57 1 3
		Dividend on reserve fund	319 9 2
	£23,744 12 8		£23,744 12 8

No. 5.—RESERVE-FUND.

To Balance on June 30, 1874	£20,000 0 0	By Balance on Dec. 31, 1873	£20,000 0 0

No. 6.—RENEWAL-FUND (LEASEHOLD).

To Balance on June 30, 1874	£9,160 14 10	By Balance on Dec 31, 1873	£9,016 16 5
		Interest on amount invested	143 18 5
	£9,160 14 10		£9,160 14 10

No. 7.—STATEMENT OF COALS.

Description of Coal.	In Store, Dec. 31, 1873.	Received during the Half Year.	Carbonized during the Half Year.	Used during the Half Year.	In Store, June 30, 1874.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle coal	8,628	37,803	39,814	224	6393
Cannel coal	2,479	442	74	..	2847
	11,107	38,245	39,888	224	9240

No. 8.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In Store, Dec. 31, 1873.	Made during the Half Year (estimated).	Used in the Half Year (estimated).	Sold in the Half Year.	In Store, June 30, 1874.
Coke . . . . . Chaldrons of 36 bushels	3,160	39,620	12,752	29,963	65
Breeze. . . . . do. 36 do.	190 = 380 yards	2,298	...	2,299	189
Tar. . . . . Gallons .	12,900	379,343	1,000	373,973	17,270
Ammoniacal liquor Bts., 108 gall. 10-oz. stgth.	2,627	7,959	..	10,042	544

No. 9.—STATEMENT OF GAS MADE, SOLD, &c.

Description of Gas.	Quantity made, partly measured in Gasholders.	Quantity Sold.			Quantity used on Works, &c., partly estimated.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity sold.				
Common	Thousands. 395,663	Thousands. 37,569	Thousands. 338,479	Thousands. 376,048	Thousands. 3,500	Thousands. 379,548	Thousands. 16,115	3578

No. 10.—BALANCE-SHEET.

To Capital—				By Cash at bankers		£7,384 14 8
For balance, per account (No. 2).		£12,907 6 3		Amount invested in Three per Cent. Consols—		
Reserve-fund, per account (No. 5)		20,000 0 0		Reserve-fund.	£20,000 0 0	
Renewal-fund, per account (No. 6)		9,160 14 10		Renewal-fund	9,160 14 10	
Net revenue account, for balance, per account (No. 4)		23,579 1 3				29,160 14 10
Sundry tradesmen, for amount due for coals, stores, and sundries. .		6,294 4 7		Cash in hand for freight, accounts, &c.		600 0 0
Deposits by consumers		2,637 2 2		Stores in hand—		
Property-tax account		87 12 6		Coals	£14,253 13 11	
Dividend account (outstanding)		83 0 7		Coke and breeze	77 19 0	
Temporary loan		5,000 0 0		Tar and ammoniacal liquor	401 17 8	
				Sundry stores	4,450 14 0	
						19,184 4 7
				Accounts due to the company—		
				Gas-rental, quarter ending June 30, 1874 . . .	£20,794 15 8	
				Arrears outstanding	504 18 8	
						21,299 14 4
				For coke and other residual products		1,557 4 8
				Sundries		242 19 11
				Interest		319 9 2
		£79,749 2 2				£79,749 2 2

I certify that the above accounts are correct.

(Signed) CHARLES H. PARKES, Official Auditor.

Sept. 17, 1874.

The CHAIRMAN: Gentlemen, in moving the adoption of the report and accounts, I shall have very few observations to make. You will have observed that there is a deficiency in the profits of the half year to pay our accustomed dividend; but, as the accounts show, there was a balance in hand, which has helped us very much in this matter, and has enabled us, notwithstanding the increase in the cost of coal, iron, and labour, to make up the deficiency, without being obliged to raise the price of gas—a point with us of very great importance, and one which, of course, must be very satisfactory to our consumers. We shall still have a balance to the credit of net revenue account, which will be available on a future occasion, should the high price of materials continue, for a similar purpose. I am pleased, however, to say that prices are going down, though I doubt whether they will ever return to their former standard. I need hardly repeat what I have so often stated at these half-yearly meetings since I have had the honour to occupy my present position, that I believe this is one of the soundest concerns in London, and that, therefore, the deficiency in the profits of the last half year to make up the dividend need not give you any alarm. In fact it furnishes a proof of its stability, for if it had not been for the previous prosperity of the company, we must, in the face of recent circumstances, have raised the price of gas. I am happy to say there is now no prospect of such a necessity, as the cost of coal is going down, and therefore our consumers will continue to be contented. You will be surprised to know what a retail trade the supply of gas is after all. I may tell you that of the total number of our consumers, we have 801 whose yearly payments to the company are under £1 each. And, recollect, this £1 per consumer is spread over four collections, and our rule is that the collector shall call twice every quarter for the amount due. The next class of consumers are those whose annual account is under £2, and of these we have 2427. Of consumers under £3 there are 5795; and of consumers under £5 there are 9591. And what do you suppose is the average rental received from each of our customers, including the railway companies? The average is about £6 a year. I am not going into the question of the present state of the agitation. You know what we are threatened with. The Metropolitan Board of Works are about to apply to Parliament for power to manufacture and supply gas themselves; the corporation are about to do the same for the City. Is it reasonable to suppose that the consumers of London will ever submit to be taxed as they must be to enable these two public bodies to enter upon a competition with the gas companies? I do not believe they will, and I do not at all imagine that the Legislature will sanction it. There has been a great deal said of late about sulphur in gas, and it is said that we are poisoning people by not removing it. I do not think it is at all necessary that I should go into that question. I will only say that we do everything in our power to supply gas as pure in quality, of as high an illuminating power, and at as low a cost as we can. As I said before, our own consumers are satisfied, and I hope and believe they will continue to be so. I shall be happy to answer any question that may be put to me, and I will conclude my remarks by moving that the report and accounts be received and entered on the minutes.

Mr. GRAY: I have much pleasure in seconding the motion. I believe, from what has been said in connexion with the supply of gas during the last few days, that the corporation and the Board of Works would never be satisfied with any concession which the companies might make to them. As far as this company are concerned, it has been well managed from the beginning, and though in the early history of it there were many difficulties to contend with, those difficulties were successfully met and removed. Being myself interested in some other metropolitan companies, I am rather sorry you are so prosperous, for while you can pay 10 per cent. with gas at so low a price, it has been found necessary elsewhere to increase the price, which, of course, is always distasteful to consumers. In the case of the Chartered Company, however, the directors are enabled, and have announced their intention, without any compulsion, to reduce their price from the beginning of next year. Even this does not satisfy the corporation, who now want to get the supply into their own hands. The companies, I dare say, would not care about that, providing they were indemnified for the money they have expended upon their works. As to the complaints made against the companies, they are groundless, for it must be obvious to all that their interests must make them anxious to maintain a good understanding with those who take their gas, and I believe they are so. But it is unreasonable to suppose that they will supply the public without receiving an adequate remuneration for their outlay.

The motion was put, and carried unanimously.

Mr. DREW moved—"That a dividend at the rate of 10 per cent. per annum be now declared, and made payable on the 8th inst., and that the warrants be transmitted to the proprietors by post."

Mr. REILY seconded the motion, which was carried.

Mr. ROSTRON: It is a pleasing feature in the position of our affairs that the chairman thoroughly believes in the future success of the company, because in his position he must have information which we do not possess, and which enables him to form a correct judgment. He has referred to the agitation against the gas companies generally, and while I agree with him that it is right to do all in our power to satisfy our consumers, I believe it is utterly impossible to succeed in satisfying vestrymen, who, wanting to retain their position as such, appeal to the ignorance of the ratepayers. I rose to make a remark upon the state of the accounts. I have here the last three statements before me, and I find that the profits of the company for the half year ending June 30, 1873, were £17,394. In the following half year the profits fell to £9853, which left a deficiency of £6629 in the amount necessary to pay the dividends. I am glad to observe that there is a slight improvement this half year, and that instead of £9853, the profits amount to £11,430. In the mean time, however, the sum necessary to pay the dividends has increased. It now requires £17,500, so that there is still a deficiency of £6070. In other words, we have had to take out of the undivided balance during the 12 months no less than £12,699, being considerably more than one-third of the total dividend for the period. We have still upwards of £6000 of unappropriated profits in hand, which, supposing we are no better nor worse next half year than we were last, will enable us to make up the dividends on that occasion. I am happy, however, to know that coal is cheaper, and, without wishing to ask any trade secrets, I should like to know from the secretary what is the condition of our coal contracts. I am sure the directors are desirous to avoid an increase in the price of gas, but if there is not a reasonable prospect of maintaining the present price, I think it would be well that we should not go on as we are going until the whole of the undivided profits are absorbed, and we are obliged to attack the reserve-fund to make up future dividends. I should like to see that preserved untouched.

The CHAIRMAN: But the object of the reserve-fund of £20,000 is to equalize dividends in case of emergency.

Mr. ROSTRON: If we ever dip into that we may be in the unfortunate position of having to raise the price of gas, when it would be specially distasteful to the consumers.

The CHAIRMAN: I think there is no prospect of it.

Mr. ROSTRON: I am glad to hear it. I was only going to remark that, while endeavouring to conciliate the public as far as possible, we must not forget our own interests.

The CHAIRMAN: We have well considered the subject, and we think we are at all events safe for another 12 months.

Mr. MAY: It seems to me that for the last 12 months the South Metropolitan Company have been supplying the public with gas at a loss of 4d. per 1000 cubic feet. Had the price been increased 4d., we should not only have kept our reserve-fund intact, but we should have had the same amount of undivided balance that we had a year ago. We have, therefore, been supplying the public at our own loss.

The CHAIRMAN: You forget that the undivided balance was an amount of money which really belonged to the consumers, and we have been returning it to them by keeping down the price of gas. We have not touched our reserve-fund.

Mr. MAY: I think if the public fully understood that we have been supplying gas at a loss of 4d. per 1000, which is really the fact, they would see that they had not much occasion to complain.

On the motion of Mr. GRAY, a vote of thanks was given to the chairman and directors for their continued attention to the affairs of the company.

The CHAIRMAN: I thank you, gentlemen, for the vote you have just passed. It is a compliment which we highly appreciate. We do exert ourselves to the utmost of our ability to conduct the business of the company efficiently, and I believe in all its interests there is nothing lost sight of. We economize in every way for the benefit of the shareholders and the public, and it is gratifying to know that our consumers generally are thoroughly satisfied.

Mr. GRAY: I wish to propose a vote of thanks to Mr. Livesey, our secretary and engineer. I believe the prosperity of the company is largely due to his able management, and hope he may live long to fill his present position, and that the directors will see that his remuneration is proportioned to the value of his services.

Mr. LIVESEY: Gentlemen, in acknowledging this vote of thanks, which has been proposed and carried in such a cordial manner, I can assure you that I accept it as a sincere expression of your appreciation of the services which I have been able to render the company. I know that in some cases it is considered that the duties of a gas manager are very easy; but during the last year I have

had large intercourse with gas managers throughout the country, and the universal testimony is that they have much more to do now than they had formerly. Dividends do not grow like weeds, especially in the present time. The management of gas-works requires constant care and attention, and it is no easy matter to have the responsibility of the supply of 13 square miles of London and 15,000 or 16,000 consumers. I am very happy to be able to say that the consumers of this company are thoroughly satisfied; and, dealing as we do with a number of parishes, the Board of Works, and the Board of Trade, I think I may say that all those bodies are satisfied that they have no cause of complaint against us. With reference to the remarks of Mr. Rostron about the coals, I may say that we have acted on a somewhat different principle to what we did formerly. We used to make our contracts in the month of February for the supply of the year; but when coals went up so enormously, instead of making contracts for 12 months we made them for six months, and afterwards for three months, so that we were able to take advantage of any reduction which might occur in the price. Last year our highest price was 20s. per ton in the Tyne; this year we got them, at the beginning, at 15s.; and now we have a contract for the winter at 10s. in the Tyne, less 2½ per cent.; and we shall be ready in December to take advantage of any other drop in price that may take place. Our prospects, therefore, for next year, are very encouraging. I do not say that we shall make our full profits, but we shall continue to carry on our business with gas at 3s., and be able to maintain your full dividend. We are rather over-weighted at present. We have expended much money on new works, which money was raised at 10 per cent.; still, I believe we shall maintain our dividends with the present low price of gas, and keep our reserve full. I am much obliged for your thanks; and I may say, in conclusion, that not to me only, but to all who work under me, are you indebted for the successful management of this concern. I am served most admirably by a staff of 30 or 40 officers, and a body of 500 workmen, who always willingly do what is required of them.

The proceedings then terminated.

SURREY CONSUMERS GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the Terminus Hotel, London Bridge, on Monday, Oct. 5.—B. DUVAL, Esq., in the chair.

The SECRETARY (Mr. Boddy) having read the notice of meeting and the minutes of last meeting, the following report was presented:—

The balance-sheet and accounts of the company for the past half year are hereto annexed.

The net profit for the half year, after providing for the payment of interest due upon the debenture bonds, and including the balance of £4929 14s. 5d., brought from the account of the previous half year, is £13,509 7s.

It will be seen that the profit realised upon the half year's working falls short of the amount required to pay the statutory dividend; and in order to supply the deficiency, it will be necessary to withdraw the sum of £2920 7s. 5d. from the unappropriated balance of the last account. This result is consequent upon the high price of coals and the low price obtained for coke. The directors have, however, the satisfaction of stating that they have made contracts for the supply of coals upon more favourable terms, which they hope will enable them to reduce the present charge for gas at an early date.

Since the last half-yearly meeting, the board have been deprived, by death, of one of their colleagues, Mr. Henry Blake, whose loss they deeply deplore. The directors do not propose to fill up the vacancy at present.

The directors recommend the payment of the usual dividend of 5 per cent. upon the paid-up capital for the half year, which will leave a balance of £2009 7s. to be carried to the credit of next half year's account.

Dr. No. 1.—REVENUE ACCOUNT, *for the Half Year ended June* 30, 1874. *Cr.*

To Manufacture of gas—				By Sale of gas—		
Coals, including dues, carriage, unloading, and trimming	£28,244 4 1			Common gas per meter at 4s. 6d. per 1000 cubic feet	£34,481 5 11	
Salaries of engineers, superintendents, and other officers at works	770 0 0			Common gas	6,582 13 1	
Wages (carbonizing)	3,568 13 4					£41,063 19 0
Purification, including £201 18s. 4d. for labour	327 0 0			Rental of meters		1,048 5 1
Repairs and maintenance of works and plant, materials and labour, less £85 received for old materials	5,174 5 9			Residual products—		
		£38,084 3 2		Coke, less £521 11s. 0d. for labour and cartage	9,641 19 6	
Distribution of gas—				Breeze ,, 33 12 3 ,, ,,	164 14 9	
Salaries and wages of officers (including rental clerks)	269 0 0			Tar ,, 3 11 0 ,, ,,	2,211 10 1	
Repairs, maintenance, and renewal of mains and of service-pipes, including labour	1,204 6 9			Liquor ,, 3 11 0 ,, ,,	346 9 0	
Repairs and renewal of meters	232 10 6					12,364 13 4
		1,705 17 3		Rents receivable		318 5 0
Public lamps—				Transfer fees		4 15 0
Lighting and repairing		736 19 11				
Rents, rates, and taxes—						
Rents payable	112 9 8					
Rates and taxes	1,308 8 6					
		1,420 18 2				
Management—						
Directors allowances	750 0 0					
Company's auditors	42 0 0					
Salaries of secretary, accountant, and clerks	500 0 0					
Collectors commission	545 8 9					
Stationery and printing	159 4 2					
General charges	253 15 3					
		2,250 8 2				
Bad debts		303 0 3				
Discount		236 16 8				
Public testing-stations		15 0 0				
Total expenditure		£44,653 3 7				
Balance carried to profit and loss account, No. 3		10,146 13 10				
		£54,799 17 5				£54,799 17 5

Dr. No. 2.—CAPITAL ACCOUNT, *for the Half Year ended June* 30, 1874. *Cr.*

To Expenditure to Dec. 31, 1873	£289,347 16 5			Certified Receipts to Dec. 31, 1873.	Received since that date.	Total Receipts to June 30, 1874.
Expenditure during half year to June 30, 1874—viz.:			By Ordinary shares of £10 each.	£150,000 0 0		
New and additional meters	31 19 0		Ditto shares of £10 each, £8 paid	73,233 0 0	£6,642 0 0	£229,875 0 0
Total expenditure	289,379 15 5		Bonds	60,000 0 0	..	60,000 0 0
Balance	495 4 7					£289,875 0 0
	£289,875 0 0					

Dr. No. 3.—PROFIT AND LOSS ACCOUNT, *for the Half Year ended June* 30, 1874. *Cr.*

To Interest on debenture and bonds, to June 30, 1874	£1,567 1 3		By Balance from last account	£15,929 14 5	
Balance applicable to dividend on ordinary share capital	13,509 7 0		Less dividend on ordinary capital for the half year ending Dec. 31, 1873	11,000 0 0	
					£4,929 14 5
			Amount from revenue account, No. 1		10,146 13 10
	£15,076 8 3				£15,076 8 3

Dr. No. 4.—GENERAL BALANCE-SHEET, *June* 30, 1874. *Cr.*

To Capital—			By Cash at bankers	£7,348 10 7	
For balance, per Account No. 2	£495 4 7		Cash in office	144 9 7	
Net Revenue—					£7,493 0 2
For balance, per Account No. 3	13,509 7 0		Stores on hand—viz.:		
Debenture interest for amount due to June 30, 1874	1,567 1 3		Coals		1,802 10 0
Unclaimed dividends	350 11 6		Accounts due to the company:—		
Sundry tradesmen and others, for amount due for coals, stores, and sundries	12,088 5 9		Gas and meter rental, quarter ending June 30, 1874	£14,804 5 8	
			Gas and meter rental, arrears outstanding—		
			Private rental	£775 18 0	
			Public lighting	1150 11 11	
				1,926 5 11	
					16,730 11 7
			For coke and other residuals products		1,690 6 9
			Sundries		294 1 7
	£28,010 10 1				£28,010 10 1

The CHAIRMAN, in moving the adoption of the report and accounts, said, knowing the great agitation which had been going on out of doors during the last six months, he should not have been surprised had there been a much larger attendance of shareholders. During the next session of Parliament probably some fresh legislation on gas matters would be attempted, owing to the fact that two of the largest companies had this year applied to the Board of Trade to obtain an advance of price. For his own part he regretted that those applications were made, but they were made under compulsion, and there was no help for it. But notwithstanding in the one case an advance from 3s. 9d. to 5s., and in the other to 4s. 8d., was allowed, there was a very large deficiency in one instance in the amount necessary to pay the statutory dividend. The public spoke of the companies as arbitrary in their proceedings, and as extorting too much from the consumers, and yet there was only one company in London that had been able to make 10 per cent. during the last twelve months. Certainly the Surrey Consumers Company, working as they did with the greatest economy, had not been able to do it. He hoped, however, a favourable turn would come, and that they might yet be more prosperous. One of the metropolitan companies, which in the previous half year carried over a reserve of more than £27,000 after paying their dividend, last half year had not £1000 left. That was one of the largest companies, charging 4s. 8d. per 1000. Could it, therefore, be wondered at that the Surrey Consumers Company, charging only 4s. 6d., were not able to pay 10 per cent.? At the time of the districting this company were only allowed to go up to the borough, and were not allowed to go into it, the consequence was that the only good lighting they had was in the Broadway, Deptford. It was no matter of surprise, therefore, if they could not show so profitable a balance-sheet as some of the others. They had a good engineer, and their affairs were conducted with the greatest economy, and yet their balance of net revenue, which a year ago stood at £8000 odd, was now reduced to £2059. He was happy to state that they had made a very fair contract for coals, and if, as he hoped would be the case, things went favourably with them, they would be able shortly to reduce the price of gas. The directors had never lost sight of the public, and as soon as they could, consistently with their duty to the shareholders, they would be only too pleased to carry out a reduction in price. The great bone of contention outside was the inequality in the prices of gas, and it was said that if one company could supply at 3s., surely another could. But the company referred to did not make their dividends on 3s. gas; they had been obliged to take £6000 from their reserve to supplement their earnings in the last six months, in order to pay 10 per cent. As to the proposal of the Metropolitan Board, he did not believe they would ever be allowed to supply gas, and he was sure that, if they did, the price, instead of being reduced, would be very much increased.

Mr. ATTRELL seconded the motion, which was put and carried.

The CHAIRMAN moved—"That a dividend of 5 per cent. for the half year ending the 30th of June be declared payable on and after the 12th of October."

Mr. NICHOLSON seconded the motion, which was put and carried.

Mr. ATTRELL moved a vote of thanks to the chairman and directors for their able management of the company's affairs. Adverting to the proposed bill of the Metropolitan Board for power to supply gas to London, he said the board had tried their hands at many things, and failed, and had made large claims upon the ratepayers. After spending millions upon sewerage works, it was found that those works were inadequate and defective. It was hardly likely that the Legislature would ever trust them with the manufacture of gas for London. They had already enough, and more than enough, to do, if they properly looked after their duties; and, if they had a proper regard to the interests of the public, the rates they levied would be nothing like the present amount. The "great unpaid" was always an extravagant body, and it would be an evil day for London if the Board of Works should ever be invested with the supply of gas to the inhabitants.

The motion having been duly seconded, was put, and carried unanimously.

The CHAIRMAN having acknowledged the vote,

Major BERESFORD, M.P., said, in reference to the proceedings of the Metropolitan Board, there was one word of comfort and hope. Any one who had taken the trouble to read the parliamentary proceedings during last session would be familiar with the bill introduced by the board, called the Buildings Act Amendment Bill. Perhaps a more iniquitous bill was never submitted to the House of Commons. And there was this remarkable fact about it—they called many witnesses in support of their scheme, and there was not one who did not condemn it right and left, and the bill was at last ignominiously withdrawn. It seemed to him that the aim of the board was to secure the power to raise plenty of money, and that they did not care in the least how they laid it out. He did not for one moment imagine that Parliament would be induced to give them the supply of gas, and they might depend on it the attempt to obtain the power would meet with a spirited opposition.

A vote of thanks was then presented to the engineer and to the secretary of the company for their zeal and ability in the discharge of their respective duties.

Mr. FINLAY and Mr. BODDY having appropriately acknowledged the compliment paid to them, the proceedings closed.

PHŒNIX GASLIGHT AND COKE COMPANY.

The Adjourned Half-Yearly General Meeting of Proprietors was held at the Bridge House Hotel, Southwark, on Wednesday, Oct. 7—EDWARD HORNER, Esq., in the chair.

The SECRETARY (Mr. I. A. Crookenden) having read the notice of meeting, the seal of the company was affixed to the register, the minutes of the last meeting read and approved, and the following report and statements of account presented:—

The directors herewith submit trade account and balance-sheet to 30th of June last.

It will be seen that, notwithstanding the increase in the price of gas to 4s. 6d. per 1000 feet, the net balance available for dividend is insufficient, and the sum of £3213 0s. 10d. will have to be taken from the reserve-fund to make up the statutory dividends.

This result has been caused by the high price of coals, materials, and wages, and the low prices which have prevailed for coke.

The new contracts for coals to be supplied during the current half year being on more favourable terms than for the past six months, the directors have reduced the price of gas to 4s. 2d. per 1000 feet, from the quarter terminating at Midsummer last.

The balance of profit and loss, as shown in the last report, has been invested, and added to the reserve-fund.

The net amount of profit for the past half year being £34,811 19s. 2d., your directors recommend that the sum of £3213 0s. 10d. be taken from the reserve-fund and added thereto, making together £38,025, and that dividends be declared as follows:—On the £20 divided shares, 10 per cent. per annum, £27,000; on the £20 new stock, 7 per cent. per annum, £7425; on the £20 capitalized stock, 5 per cent. per annum, £3600; making a total of £38,025, less income-tax.

ABSTRACT OF THE TRADE ACCOUNT, *for Six Months ending June* 30, 1874.

Dr.		*Cr.*	
To Coals used	£87,803 3 10	By Rental	£137,413 15 11
Materials supplied	13,888 4 3	Coke	32,390 14 4
Meters—repairs and renewals	1,371 19 4	Breeze	1,024 15 10
Rates	4,144 11 3	Tar	2,833 19 6
Directors, £1000; auditors, £50	1,050 0 0	Ammonia	2,203 16 6
Salaries and commission on collection	5,523 6 11	Rents	1,358 7 0
Pensions	616 7 1	Miscellaneous receipts	902 12 6
Wages	22,543 5 8	Interest	114 13 0
Bad debts and allowances	1,267 6 6		
Interest on bonds	3,625 0 0		
Leasehold-fund	430 0 0		
Rents	446 11 6		
Interest	174 1 11		
Law	46 17 2		
Net profit	34,811 19 2		
	£178,242 14 7		£178,242 14 7

ABSTRACT OF THE BALANCE-SHEET, *June* 30, 1874.

Dr.		*Cr.*		
To Capital of 27,000 £20 shares, paid in full (maximum dividend 10 per cent.)	£540,000 0 0	By Amount of plant on Dec. 31 last		£934,141 18 4
Capitalized stock, paid in full (maximum dividend 5 per cent.)	144,000 0 0	Expended this half year for extension of works		9,820 10 8
New stock, £360,000, £55 per cent. paid up (maximum dividend 7½ per cent.)	198,000 0 0			£943,962 9 0
Bonds, at 5 per cent.	145,000 0 0	Investment of leasehold-fund		19,951 12 3
Unpaid dividends	119 4 3	Ditto of reserve-fund		49,282 7 9
Unpaid tradesmen's bills, &c.	21,930 11 5	Amount due for rental—		
Leasehold-fund	19,951 12 3	Midsummer quarter	£48,127 3 8	
Reserve-fund	49,282 7 9	Arrears	694 5 5	
Profit and loss	34,811 19 2			43,821 9 1
		Amount due for coke and breeze	£13,602 7 7	
		Ditto tar	675 16 2	
		Ditto ammonia	837 13 6	
		Ditto sundries	3,117 9 3	
				18,233 6 6
		Stock of coals	£6,844 10 0	
		Ditto coke	627 10 0	
		Ditto breeze	46 5 0	
		Ditto tar	197 11 8	
		Ditto ammonia	248 9 3	
		Ditto retorts	682 18 6	
		Ditto pipes	913 10 0	
				9,560 14 5
		Meters		42,647 1 8
		Balance at treasurer's		20,636 14 2
	£1,153,095 14 10			£1,153,095 14 10

The CHAIRMAN: Gentlemen, I rise to move—"That the report and accounts be received and entered upon the minutes." In doing so I have to express my regret that our accounts are not so flourishing as we could wish, inasmuch as we are obliged to take some money from the reserve to enable us to pay our dividends on the present occasion. This, of course, has been caused by the high price we have been obliged to pay for coals during the last six months, and by the very poor returns we have received for our coke. We have paid during the last six months no less a sum than £24,776 more for coals than we did in the corresponding half year of 1873, while we have received £8617 less for our coke than we did at that period. I find, on referring to the accounts, that our coals cost us £87,803, and our receipts for coke were £32,390—the difference between the two being no less than £55,413. And yet it has been argued very strongly by some people that the price of coal was perfectly immaterial; that it does not matter what we pay for it, because the value of the residual products is always in proportion to the cost of coal. You see, however, that the result is entirely the contrary, and we have a most convincing proof of it in the fact that the difference in the last half year is no less than £55,413. This loss of £55,413 is within £7614 of the total cost of our coals in the corresponding six months of 1873. And yet we are told that the cost of coal is of no consideration at all, that it does not enter as an element into the cost of making gas, because the advanced value of residuals compensates for any increase in the price. We could not have a better illustration of the fallacy of this assertion—an assertion which can only be made in ignorance of the facts or knowingly for the purpose of damaging the gas companies. Formerly the difference between a ton of coal and a chaldron of coke was 6s. 3d. or 6s. 4d., whereas the difference last half year was 13s. 3½d., or a loss to the company of no less than 7s. for every ton of coal carbonized. Of course, upon 70,000 tons of coal, this difference of 7s. per ton represents an enormous sum of money. I have taken a little trouble to calculate what we should have paid for coals, supposing we had bought them in the last six months, as we formerly did, at about 14s. per ton. I have assumed the price to be 14s. 2d., and I find they would only have cost £48,218 as against £87,803, the actual cost being a difference of nearly £40,000. Our coke at the old price—and a very poor price it was—would have realized £21,000, so that the difference between the two would only have been £27,218, instead of £55,413, as it actually was. And yet the public and the vestries say it does not matter to us what the price of coal is, because the price of coke is sure to make up the difference. We were flattered a year or two ago with the prospect that there would be something like a proportion between the two, but we find in practice that to expect it is to lean upon a broken reed. I think this disposes entirely of the question about the increase in the price of gas, for no reasonable person would suppose it possible that a company could supply a manufactured article at the same price when the cost of the raw material was advanced to double the former cost. Our rental during the half year has improved, because we have raised the price of gas. It was £23,180 more than in the corresponding period of 1873. The other workings of the establishment may be considered good; in fact, in some respects, very good. The unaccounted-for gas, which, of course, is a very important matter, and one which is made a great deal of against us, has been only 6·7 per cent. during the past half year, and from that must be deducted 1·7, or rather more, for the gas consumed on the works, leaving the unaccounted-for gas at really less than 5 per cent. I do not think the Metropolitan Board of Works, if they should ever supplant us, will do much better than that; there is not a very large margin for improvement in this respect. Our officers, I consider, may fairly be congratulated upon the result, that they have succeeded in sending out so large a quantity of gas with so small an amount unaccounted for. The other residual products have yielded about the same money as before. We have, unfortunately, got old contracts for tar and ammonia, which are not quite run out, and consequently we are not getting so much money as we should do if the contracts were being made now. We, of course, must take the chance of the market; these are things which cannot be be stored, they are made in such enormous quantities, and we must get rid of them, and when our existing contracts were made, the value of them was not so great as it is at present. In reference to the gas question with the public, you are aware that we have had complaints made against us, and among others it is said that we divide 10 per cent. among our shareholders. Now it is perfectly true that on part of our capital we do divide 10 per cent.—*i.e.*, upon the original capital, which bore the brunt of introducing gas into this part of the metropolis, but the average amount of interest upon the paid-up capital of the company amounts to only £8 2s. and a fraction per cent., and when our entire capital is called up, and everything we can borrow is raised, the average will only be £7 16s. 8d. per cent. I do not think this can be considered an outrageous amount of interest to receive for capital invested in a business which, to say the least, has certainly some risk in it. Gas lighting may some day be supplanted by electricity, or some other discovery or scientific development, and our property will then become of no value whatever. To show you that it is not so easy as it is said to be to raise capital at 5 per cent., let me point you to our 5 per cent. capitalized stock. It is not up to par—I believe only about 90—proving that the public do not care to risk money in gas undertakings at a low rate of interest. I can recollect the time very well when the Imperial Company obtained an Act of Parliament to call up capital at 7 per cent. For a long time the proprietors would not take it, and all the money invested for some considerable period was subscribed by the directors themselves. I merely mention these facts to show that the rate of interest paid by gas companies is, with few exceptions, not a high one. There is one other thing I should like to refer to. Of course, one does not much like to speak of other companies, but sometimes it is necessary to do so. It has been said that the South Metropo-

litan Company are supplying gas at 3s. It is true they do so, but they cannot pay their dividends at 3s. Here is their half-yearly account just published, showing that they earned £11,430 during that period, and that they require £17,500 to pay their dividends. They have, therefore, to resort to the balance of former profits to make up the deficiency of £6070. They have also a reserve-fund, but when that is exhausted, the chances are that if there is in the meantime no great reduction in the price of coal, they may be obliged to raise the price of their gas. I have not gone into the figures, but I think that their price for gas would not now be less than 3s. 6d., supposing they had not had that fund to go to. I do not say this as against the South Metropolitan Company, but I think the public mind should be disabused of the notion that any company at the present time can make gas and sell it at 3s. per 1000, and pay their shareholders 10 per cent. With regard to the intimations we have received lately that the Metropolitan Board of Works and the corporation are going to Parliament to obtain powers to supply gas in London, I can only say I hope that they will not succeed. If they do, it will be one of the most unreasonable things ever heard of in this country. Parliament has never yet sanctioned the principle of allowing public bodies to trade upon the rates in competition with companies working under statutory powers, and I do not believe it will do so now. Just see what would be the effect, supposing they succeeded in getting their bill. Of course, they cannot suppose that we should let them take all our business away from us. No doubt they would get some, and we should retain some, and I have no hesitation in asserting that the companies would beat the Board of Works very quickly; and, though our property would be depreciated, we should get the best of it in the end, and the ratepayers would have to make up the losses sustained by the board. And, then, look again at the inconvenience which it would occasion the public. Every street in the metropolis would have to be pulled up to lay down fresh pipes; there would be two enormous capitals employed to carry on the work of supplying gas to the inhabitants, which one capital is now doing quite efficiently. One of the charges made against the gas companies is that they are sometimes paying dividends upon unproductive capital. Do the Metropolitan Board of Works suppose that they can raise money, and buy land, and erect works without having to pay interest until the supply of gas by them becomes remunerative? Do they imagine that those of whom they borrow the money will forego their interest until the works become productive? And yet this is what they seem to think should be the case in reference to the companies. Surely there was never a more absurd argument advanced even by these delegates of the vestries, who go there to vote as they are ordered. I am sorry to find that amongst the whole of that body there are so few who can venture to take an independent position, and do what they know to be just. However, if they persist in going on with their bill, we shall make the best fight in our power when the time comes; but I trust better counsels may yet prevail, and that they will be induced to withdraw from proceedings which they must know will cost the ratepayers an enormous sum of money, and the companies too, the whole of which must also eventually come out of the consumers pockets in some way or other. We are not without instances of corporation management of gas-works being unsuccessful. If you take the JOURNAL OF GAS LIGHTING of yesterday, you will find that at Leeds the corporation have just made a rate of 6d. in the pound upon the whole of the inhabitants, to make up the losses sustained by their gas undertaking; and the ratepayers are told that instead of a loss of £4000, which is the estimate for the next half year, the loss on the present year will amount to £18,000 or £20,000, so that the gas-rate may be increased to 2s. in the pound. I am unfortunately a shareholder of a company in a town in which there were two gas-works. The corporation bought one, and we have been in opposition ever since. And what is the state of the case? We have made but little progress, and the corporation are about to levy a rate of 5s. in the pound to make up their losses. This is just what may be expected if the Metropolitan Board should succeed in getting their bill. If they wish to supply gas and water themselves, let them take our works into their own hands, paying for them in the same way that they would do any other property, and not attempt to establish a rival undertaking, which can only result in disappointment and loss. It seems to me, however, that the attempt they are now making is prompted by a desire to depreciate our property as much as they can, so that they may hereafter buy it at a reduced price. Now, gentlemen, I have put before you as well I can the state of the company, and have dwelt as largely as I think necessary upon the very disagreeable public question which is now being discussed, and I will, in conclusion, move—"That the report and accounts be received and entered on the minutes."

Mr. SHAND (deputy-chairman) seconded the motion.

A SHAREHOLDDR: How many shareholders are there in the company?

The SECRETARY: 871.

A SHAREHOLDER: I see from a note at the end of the report that the dividends will be paid on the 17th. I do not see why the money should remain so long in the coffers of the company. Why not pay the dividends as the North-Western Railway Company do—on the day of the meeting, or immediately afterwards?

Mr. DOWNS: The dividends were formerly paid directly after the half-yearly meetings.

The SECRETARY: In that case we used to close our transfer books three months beforehand. Now they are only closed for a fortnight.

Mr. CYRUS LEGG: I think the chairman has been rather hard upon the Metropolitan Board of Works. I cannot for a moment suppose that the Legislature will grant either to the Metropolitan Board of Works or to the Corporation of London the power to manufacture gas, but I think it possible that when they get before Parliament, an arrangement might be come to by which some additional supervision may be exercised by them over the companies. Whether or no that will tend to the benefit of the consumers I am not prepared to say. The impression seems to be that of late years the Legislature have attended rather more to promoting the advantage of the companies generally, and I should like, seeing how much opposition there is at the present time to the gas companies, if the directors of this company could have done so, that their report should contain a statement as to what the price of gas was when competition was rife, and what the price is now. At one time the companies could hardly pay a dividend at all, and now they pay 10 per cent. It seems to me that, though dividends have risen, the price of gas has fallen very much of late years. The observations which the chairman made as to the average rate of dividend paid by this company I should like to have seen embodied in the report, so that the Metropolitan Board and the public generally might be set right upon that point. People run away with the idea that the companies are paying 10 per cent. upon the whole of their capital; whereas, as we have heard to-day, in the case of this company, at all events, it averages only £8 2s. I confess that to my mind it seems to have been bad policy on the part of some of the companies to avail themselves of the revision clauses of the Act of 1868, and go before the Board of Trade Commissioners for an increase of price. They have the power, within certain limits, to pay back dividends, and I think it would have answered their purpose better, when the cost of coal was so high, to take 1 or 1½ per cent. less, trusting to be able in the following year to recoup the deficiency, rather than to advance the price of gas at once, which is the cause of all this hubbub. As a gas proprietor, and as a member of the Metropolitan Board of Works, I do not think the public have much cause for complaint against the companies. I am sure that the present districting arrangements are much better than having the streets constantly broken up for the mains of two or three companies running through them, and I am sure, also, that the streets are even now so encumbered with gas and water pipes that there is not room for any others. There is an application from one of the companies before the board at the present time for leave to lay a large main up towards the West-end, and they do not know where to put it. There is no room in the subway, and the vestry of St. George, Hanover Square, will not have it through their streets. Is it likely, then, that Parliament will sanction the laying down of an entirely fresh set of mains all over the metropolis? I believe the gas companies have sufficient power, in the House and out of it, to prevent any competition either by the Metropolitan Board or the corporation, and I am sure if such competition existed, the consumer would not for one moment be benefited. It would certainly result in the public being rated a little more, and the complaints against the present rates of the board are loud enough as it is. They are something like 4½d. or 5d. in the pound, which is quite enough. But if the board are to begin the manufacture of gas, they must raise a fund to pay for the erection of works, laying down pipes, &c. Do you suppose for a moment that the public will put up with that? I do not. Irrespective of my connexion with gas companies, I can only say that I believe there is a great outcry against them without any cause. The public fancy that because the companies pay 10 per cent. upon (some part of) their capital, that they are very extravagant. I am opinion, on the contrary, that this company, and all the other companies in the metropolis try to be as economical as they can in the cost of management, and that they get as much gas out of the coal as they can with the least possible expense. I am sure, too, that if any new mode of manufacture could be discovered, cheaper and more effective than the present, they would adopt it. The Metropolitan Board of Works, if the supply of gas were in their hands, could do no more. The personal and individual interest which is felt in the working of a company makes all anxious to do their best, and I have not enough faith in public bodies to believe that, in the hands of the Metropolitan Board, there would be that careful supervision there is now. Whether they will succeed with their proposed bill remains to be seen. There have been great fights on many occasions before; whether the board have had the best of these conflicts, I must leave the public to judge. It seems to me, in reference to the agitation on the gas question, that there are many people who want to make capital out of the companies, having very little capital of their own.

The CHAIRMAN: In reply to the observations just made, I may say that up to 1866 our average rate of dividend was £5 17s. 6d. per cent., and the price of gas was never below 3s. 9d. at any time. In 1841 the price was 9s., and it gradually fell to 8s., 7s., 6s., 5s., 4s. 6d., until in 1870 it was 3s. 9d. The inquiry just made gives me the opportunity of making a remark. I may say, as Mr. Disraeli said a little while ago, that I can talk of events that happened more years ago than I like. I remember the time when three companies were in this district, and the leakage of each of these companies was something like 33 to 35 per cent., so that the consumption of coal for gas-making was double what would otherwise be necessary for the supply of the district. There is now only one leakage instead of three. This is one of the advantages of the districting arrangement. I believe, too, that in consequence of the difficulty of distinguishing their respective pipes, it was then not an uncommon thing for a company which got a new customer to put him on their opponents main. From the time the districting was entered upon our dividends began gradually to rise; we made our dividends from the immense saving which was effected from the absence of opposition. Mr. Legg has told us that we may comfort ourselves with the reflection that legislation generally has done good to the companies and not the consumers. I think there is something in that, for if the Metropolitan Board and the corporation had not brought about the legislation of 1868, the Imperial and Chartered Companies would never have been able to charge more than 4s. 6d. Under the Acts of 1868 and 1869 the dividends are virtually guaranteed to those companies, because if they cannot earn them at one price they may go to the Board of Trade for an increase. The secretary reminds me that since the districting arrangements, confirmed by the Act of 1860, the reduction of price to the consumer has been a greater per centage than the increase of dividend to the shareholders.

The motion was then put, and carried unanimously.

Mr. SHAND moved—"That dividends for the half year ending June 30 last be, and the same are hereby declared and made out of the profits of the undertaking, at the following rates:—"On the original shares at the rate of £10 per cent. per annum, on the capitalized stock at the rate of 5 per cent. per annum, and on the new stock at the rate of 7 per cent. per annum, less income-tax in each case, such dividends to be payable to the bankers of the proprietors so ordering it, and the remaining dividends to be forwarded by post." He was sorry that the profits of the half year were not sufficient to pay the full amount of these dividends, but the company possessed a reserve-fund from which they could take a little to supplement their earnings on this occasion. He hoped that the reduction in the cost of coals and other matters would obviate the necessity for coming upon the reserve-fund next half year.

Mr. HARRIS seconded the motion, which was put and carried.

Mr. LEGG asked what was the present price of coal?

The CHAIRMAN: We are now paying about 19s. 6d. per ton, as against 25s.

Mr. LEGG: When do your contracts expire?

The CHAIRMAN: We have made no contracts beyond the 31st of March next, just enough to carry us through the winter—we did not wish to tie ourselves to high prices longer than necessary.

Mr. LEGG: Then the saving is something like £20,000 in the price of coal?

The CHAIRMAN: Yes; about that. As soon as we found ourselves in that position, we gave notice to reduce the price of gas, and we hope to do something more. You will have observed, in reading the accounts, that the undivided balance of former years has been entirely invested as a reserve-fund. We have been in the habit of using that money as working capital, and we must now replace it. We have, therefore, announced that we are going to call up bonds to the amount of £30,000, at 5 per cent. This requires no resolution, as in December last full power was given to us to call up those bonds. I hope, when next we meet you, we shall be in a more prosperous state, that we shall not have the prospect before us of a great parliamentary contest, and that we shall be able to announce a still further reduction in the price of gas.

Mr. LEGG: I beg to propose a vote of thanks to the chairman and directors for the very able manner in which they have conducted the business of the company in the last half year. I believe our chairman is one of the most able chairmen to be found anywhere, and I know that no one can be more anxious for the interests of the proprietors than he is. I am sure that he and his co-directors are fully entitled to our thanks.

Mr. DOWNS seconded the motion, which was put, and carried unanimously.

The CHAIRMAN: Gentlemen, on the part of my brother directors and for myself, I can only say that we are exceedingly obliged to you for this expression of approval. It is perfectly true that we do endeavour to do the best in our power not only for your interests, but also for the interests of the public. I assure you there is nothing which causes us more anxiety than not being able to serve the public on the terms which they think they ought to have. As to our report and accounts, I trust that they may be well examined and considered, for I am perfectly certain that the more they are studied, the more clearly will be seen the genuine way in which the affairs of the company are conducted. We are much obliged for the compliment you have just paid us.

The proceedings then terminated.

CAGLIARI GAS AND WATER COMPANY, LIMITED.—The directors have declared a dividend for the first six months of the present year at the rate of 4 per cent. per annum, or 8s. per share.

CHRISTCHURCH (CANTERBURY), NEW ZEALAND, GAS, COAL, AND COKE COMPANY, LIMITED.

The Annual General Meeting of the Shareholders of this Company was held at the Offices, Gloucester Street, on Monday, March 2—Mr. W. H. Lane, chairman of the board of directors, in the chair.

The notice convening the meeting having been read,

The Secretary (Mr. C. W. Bishop) read the annual report of the directors and statements of account as follows:—

Your directors have to announce that during the past year the progress made in increasing the sphere of operations has not been so rapid as was hoped for. The delay in getting the necessary plant to hand has been very great and vaxatious. However, it is so far satisfactory to be able to state that the new gasholder is in position and working well. The pipes for the new mains are being deposited in the localities through which new mains are to be laid, extending over a length of about 400 chains, and every exertion will be made to have them in full working order before the winter sets in.

A statement of the company's accounts accompanies this report, showing a sum of £3411 5s. 9d. profit on the year's transactions; the amount of £1177 10s., as interim dividend, has already been paid, and with the balance from last year there remains £2259 8s. 8d. free for appropriation.

Your directors recommend that £1668 2s. 6d. be appropriated in payment of dividend, £548 1s. 8d. be placed to depreciation and reserve fund, and £43 4s. 6d. be carried forward, making a total of £2259 8s. 8d.

Four directors will have to be elected—viz., three to replace W. P. Cowlishaw, Esq., C. R. Blakiston, Esq., and E. G. Wright, Esq., who retire by rotation, but are eligible for re-election; and one to serve in the room of E. C. J. Stevens, Esq., who resigned, consequent on his visiting England.

Working Account for the Year 1873.

Dr.				Cr.		
Stock of material on hand, Jan. 1	£213	19	8	Gas-rates and rent of meters	£6524	19	0
Coal and purifying material since procha sed	3447	18	10	Coke, tar, and sundries	1832	2	7
	£3661	18	6	Certificate and transfer fees	29	16	0
Stock on hand, Dec. 31, 1873	1055	12	9	Sale of gas stoves	34	10	6
		£2606	5 9				
Gas stoves for heating and cooking purposes	£68	4	9				
Stock on hand, Dec. 31, 1873	39	16	6				
		28	8 3				
Wages at works, & lamplighting		782	14 8				
Salaries, fees, and directors allowance		809	13 11				
Rent, taxes, and insurance		106	18 4				
Tools, materials, and repairs		176	16 7				
Stationery, advertising, printing		77	17 6				
Miscellaneous		103	6 11				
Discount and interest account		299	1 5				
Bad and doubtful debts incurred during 1873, marked off		18	19 0				
Balance to profit and loss, from working account		3405	3 6				
Ditto, from sale of stoves		6	2 3				
		£8421	8 1		£8421	8	1

Profit and Loss Account.

Dr.				Cr.			
Interim dividend, paid July 28	£1177	10	0	Balance brought forward	£13	2	5
Balance	2259	8	8	Bad debts recovered	12	10	6
				Proceeds from working account	3411	5	9
	£3436	18	8		£3436	18	8

Balance-Sheet.

Dr.				Cr.			
Capital—				Immoveable property, being freehold	£1298	12	5
2000 shares of £10 each, paid up	£20000	0	0	Moveable property, being plant	20835	8	10
2000 shares of £10 each, no call made	20000	0	0	Capital available by call	20000	0	0
	£40000	0	0	Office furniture	59	2	1
Debts due by the company	111	19	2	Funds invested on mortgage of freehold estate	1700	0	0
Bank of New South Wales	61	4	6	Debts due to the company	271	17	1
Bills payable to New Zealand Provision and Produce Company	898	6	4	Amount at Bank of New South Wales, London	550	3	5
Depreciation and reserve-fund	3091	10	8	Amount in R. Laidlaw's hands against orders shipped	455	8	2
Balance	2259	8	8	Stock on hand—			
				Coal and material	1055	12	9
				Gas stoves	39	16	6
				Cash in hand	156	8	1
	£46,422	9	4		£46,422	9	4

Mr. Cowlishaw moved—"That the report and statement of accounts as read be adopted."

Mr. W. Wilson seconded the motion, which was carried *nem. con.*

The Chairman said the next business was to elect four directors to fill the vacancies mentioned in the report.

On the motion of Mr. Tipping, seconded by Mr. Raphael, the three retiring directors were re-elected.

Messrs. W. Wilson, H. J. Tancred, and Tipping were nominated to fill the vacancy caused by the resignation of Mr. Stevens.

A show of hands was taken, and resulted in favour of Mr. Tancred. Mr. Raphael demanded a poll, which was at once proceeded with, Messrs. J. Gould and C. W. Bishop acting as scrutineers. On its termination, the chairman declared Mr. Tancred to be duly elected.

Mr. Cowlishaw moved—"That Messrs. H. E. Alport and R. Walton be re-elected auditors."

Mr. C. R. Blakiston seconded the motion, which was carried.

On the motion of Mr. Cowlishaw, seconded by Mr. Raphael, it was resolved that a dividend be declared in accordance with the recommendation of the directors.

Mr. Cowlishaw next moved that the same rate of remuneration be paid to the chairman and directors during the ensuing year as during the past 12 months.

Mr. Heywood seconded the motion, which was unanimously agreed to.

A vote of thanks to the chairman terminated the proceedings.

CORK GAS CONSUMERS COMPANY.

The Eleventh Ordinary General Meeting of Shareholders was held on the 28th ult.—Mr. T. Mahoney in the chair.

The Secretary (Mr. D. Lane) read the notice convening the meeting, and the reports of the directors and engineer, as follows:—

Directors Report to the Shareholders.

Gentlemen,—You will find annexed the accounts of the company for the half year ending June 30, 1874. In consequence of the Provisional Order which we obtained from the Board of Trade not having come into force until after the 1st of January, we were obliged to defer taking the indices of the meters until a period later than usual, and this cause, combined with the exceptionally fine weather of last spring and summer, has reduced the quantity of gas delivered to your customers, and has thus proportionally lessened your rental. The nature of our business makes it necessary to secure beforehand coal sufficient for a considerable period in advance, and we had therefore during the half year to use coal contracted for at higher prices than those which rule at present. On the other hand, the lower price of coal in the open market now has compelled us to reduce the price of coke, and thus has diminished your income from residuals. On the advice of your consulting engineer, Mr. Anderson, we have been engaged in rebuilding retorts, which we inherited from the old company. We have tested several miles of mains, and stopped leakage wherever discovered. We have also tested, examined, and repaired a very large number of service-pipes, and substituted new ones wherever necessary. These different items of outlay, some of which will not be operating in your favour until next year, amount to a sum which we did not think we were justified in charging against a single half year, and one which derived but a partial benefit from these improvements. We have therefore charged the half year with ordinary wear and tear, and a portion of this extra expenditure, and we have (as on a former occasion) carried the remainder to a suspense account to be divided over succeeding half years. The testing and repairing of mains and services have already diminished the amount of gas not accounted for; but the very operations of testing mains and relaying services, rendering it necessary to break several connexions, cause a certain expenditure of gas. The benefit to result from such outlay is therefore not fully appreciable during the progress of the work, but ultimately must lead to economy. Although a reduction has been made in the valuation of your property, the rates will not be struck at the reduced valuation until the current half year. The sum charged for rates therefore continues very high. The other items of expenditure call for no particular remark, but in the aggregate show a reduction. The balance of profit and loss account is £2720 12s. 4d. We recommend that a dividend at the rate of 5 per cent. per annum be declared; this would amount to £3210 10s. 5d., and require £489 18s. 1d. to be taken from the reserve-fund.

Engineer's Report to Directors.

Gentlemen,—Your manager, Mr. Travers, has the usual annual repairs more forward now than I have seen them for many years, and will be early in a good position to meet all demands of the coming winter. The system of new purifying apparatus is working with economy and a minimum of smell, the foul lime being almost entirely inodorous. Mr. Travers reports to me that the quantity of gas sent out during daylight on Sundays—the time at which there is scarcely any being burnt—has been reduced considerably since Mr. Still commenced examination and repairs of the mains and service-pipes. The full benefit of these operations will not accrue till after the work is finished, because the opening of the ground over defective work increases the leakage until it is made good. Several street governors have been put into the mains to reduce pressure on the high districts, but there are but few instances in which this can be done compared with the number of high districts, for the same main that supplies the high district in many cases descends to supply a low district beyond, and in such cases no governing can be done. I give Blackrock Road as one instance, Summer Hill as another. While this examination of the mains is going on, opportunity is also taken to alter the supply of a district sometimes from one main to another, by which an overburdened main is relieved, and a more equable pressure delivered. The supply to the water-works and lunatic asylum has been increased by those means, without giving any increased pressure from the works. There are other districts in which we hope to realize a similar result. The unequal growth of gas supply in different parts of the city always renders alterations of this kind necessary from time to time, to adjust the pressure throughout.

Sept. 19, 1874. (Signed) George Anderson.

The Secretary also read the following supplemental report from the engineer:—

To the Directors of the Cork Gas Company.

Gentlemen,—I have tried the Still and Lane process, and also made experiments with coal working on the ordinary process. These experiments have been conducted on the full manufacturing scale; first, at the Cork Gas-Works, then at the gas-works, Queenstown, with the following results:—At Cork we had about two bushels more coke left for sale per ton of coal used by the patent process than that produced by the ordinary process. At Queenstown this was reversed—at neither works did we get any increase of illuminating power, nor any increase of quantity of gas per ton. We proved at both works that breeze is convertible by the patent process into coke. The retorts at Queenstown were all absolutely sound and at a high heat; those at Cork were not so highly heated, and therefore not so fit to produce best results for the process. The patentees have pointed out to me that with the lower heats at Cork some of the tar used in their process may have resolved back into tar again, and for this the statistics of the experiment give no credit. This may be so, and I have little doubt is so, but there were no means of distinguishing to what extent this might be. The patentees have expressed a wish to have another trial of the process. This rests with you. I shall be happy to make another trial should you so decide, and if you do so, means must be taken to prevent all chance of any irregularities that would leave any doubt in the minds of any one. (Signed) George Anderson.

Cork, Sept. 24, 1874.

Revenue, for the Half Year ending June 30, 1874.

Dr.				Cr.			
Coals	£9,907	16	11	Rental	£13,664	11	2
Labour	2,475	18	7	Public lighting	1,727	6	0
Wear and tear	1,494	5	9	Residuals	5,326		9
Lime, &c.	188	12	6				
Water and gas consumed at works	103	8	9				
Public lighting	281	17	0				
Salaries	795	0	0				
Rents	115	4	10				
Rates	958	3	0				
Advertising and stationery	80	5	2				
Office expenses	127	5	4				
Office furniture	2	19	6				
House repairs	1	15	0				
Auditors	20	0	0				
Reserve for directors fees	175	0	0				
Profit and loss	3,990	7	7				
	£20,717	19	11		£20,717	19	11

Profit and Loss.

Thirty-second dividend	£3,729	5	7	Balance	£2,502	13	6
Interest—				Reserve-fund—for balance of 32nd dividend	1,226	12	1
Debentures, &c.	383	15	9	Revenue	3,990	7	7
Bank, &c.	153	17	3				
Charges	190	0	3				
Insurance	53	11	0				
Provisional Order, one quarter of estimated total	52	16	7				
Law expenses	5	3	11				
Bad debts and allowances	300	0	0				
Paris, Lyons, and Mediterranean Railway bonds	130	10	6				
Balance	2,720	12	4				
	£7,719	13	2		£7,719	13	2

Balance-Sheet, June 30, 1874.

Capital account—				Permanent investment to December, 1873	£133,854	17	1
Shares	£129,003	0	0	Extensions from above date to June 30, 1874—viz.:			
Debentures	18,350	0	0	Works	£1,821	18	5
Due to sundry persons	7,672	11	7	Mains	327	18	11
Dividends unclaimed	308	1	4	Services	104	13	7
Insurance-fund	793	10	2	Meters	57	6	11
Reserve-fund	851	1	10	Public lighting	25	9	5
Bank, current account	1,779	18	9	Engineering	147	19	7
Profit and loss	2,720	12	4		2,485	6	10
				Less received for account—meters and services	159	7	5
					2,325	19	5
				Due by sundry persons	717	16	2
				Suspense account, *re* late accountant	1,704	3	0
				Provisional Order	82	18	11
				Rental account	7,807	1	6
				Public lamps	1,849	11	11
				Stock—coals, meters, mains, &c.	10,505	10	8
				Cork and Macroom Railway Company—invested in their debentures	1,600	0	0
				Wear and tear—suspense account	1,032	17	4
	£161,480	16	0		£161,480	16	0

Mr. USBORNE asked whether, in the opinion of Mr. Anderson, the pipes were likely to be injured by the use of the patent process.

The CHAIRMAN: I think the question may be safely left with Mr. Anderson, who will be sure to report if any injury is likely to arise to the plant from the adoption of the process. I now beg to move the adoption of the report, which I think must be as satisfactory to you as it is to me, because it shows that we are now in a much better position than we were before; and I am sure that that which gratifies us now is but an augury of that which is to come hereafter. Turning to the report, the question of the price of coal is the all-important one to a gas company, and although we were gainers by the large stock of coal we had in contract at the period of the advance, and were able to get a higher price for our residuals in consequence of such advance, we now feel the rebound, and have been obliged to lower the price of coke before we have got any of the cheaper-bought coals into consumption. Nevertheless, we have found good come out of what looked to be evil, as the sufficiency of our working stock kept us longer out of the coal market than our fellow gas-makers, and has enabled us to secure a large quantity of first-class coals at a very substantial saving on prices paid by other companies. I may safely promise (if no unforeseen misfortune should arise) that, with a more reasonable price of coal, lessened rates, and thoroughly efficient working apparatus, you will at your next meeting be presented with a statement which will be fully satisfactory. I will here notice a topic which has arisen within the last half hour. I have this day been told that some of our shareholders are under a misapprehension as to their position in our company under our special Act of Parliament. I therefore wish to announce, for the information of all parties, that our special Act puts us in exactly the same position as any railway or other company, and that the shareholders liability is limited to the extent of their shares, and nothing further. Many of our shareholders, since the word "Limited" was dropped out of the title of our company, when we obtained our new Act of Parliament, have been under the misapprehension that they were liable, not merely to the amount of their shares, but to the extent of any debts that might be contracted by the company. Such is not the case at all. Turning now to the report of Mr. Anderson as regards the patent process, what we have to say is this:—As the question involved in the test of the patent process is of a double nature, involving not alone its value to our company, but also its use to the gas-making community in general, and its consequent commercial value to the patentees, we have decided for every reason to give the further test applied for, and have requested Mr. Anderson to make such arrangements that there may be an uncontradictable experiment take place, so as to have a final decision before our next general meeting in March. This decision of the directors has Mr. Anderson's entire approval. With these few observations, gentlemen, I move the adoption of the report.

Mr. HARRINGTON seconded the motion.

Mr. USBORNE inquired whether the item of £10,000 in the accounts included the value of meters in houses.

The SECRETARY: No, not meters in houses. When a meter is fixed in a house, it is called "permanent investment;" but it sometimes occurs that during the last half of the year there are fewer meters fixed than at the beginning, and in that case those meters are deducted, and go into stock and out of permanent investment. Those are the only meters included in stock.

The motion was then put and carried.

A dividend at the rate of 5 per cent. was declared, payable on the following day, and the retiring directors and auditor were re-elected.

Mr. LAMERTE proposed a vote of thanks to the chairman, which was seconded by

Mr. ANDERSON, who, referring to the inquiry addressed to him by Mr. USBORNE, said no possible injury could arise to the plant of the company from the use of the patent process of Messrs. Lane and Still.

The vote of thanks to the chairman was passed with acclamation, and was duly acknowledged.

LIVERPOOL GAS SUPPLY.

PROPOSED PURCHASE OF THE GAS-WORKS BY THE CORPORATION.

The Monthly Meeting of the Liverpool Town Council was held on Wednesday last—Ald. LIVINGSTON in the chair.

Dr. CROSS, pursuant to notice, moved the following resolution—"That, in order to meet the increasing complaints of the gas consumers of the town of Liverpool, it is desirable that the manufacture, supply, and sale of gas in the borough shall be under the control of the corporation; and that a special committee be appointed, and instructed to consider the advisability of acquiring the undertaking of the Liverpool United Gaslight Company on terms, and to employ such professional and other assistance as they may deem necessary, and generally to report upon the subject for the approval of the council." In a speech of some length he justified the action which he called upon the council to take, and concluded by calling upon the members "to free themselves from the manacles of the tyrant"—meaning the gas company.

Mr. TARBUCK, in seconding the motion, recommended that the council should seek only to acquire the company's plant for the supply of Liverpool alone, and leave the out-townships to take care of themselves.

After some conversation,

The TOWN-CLERK suggested the desirableness of postponing the debate until after the 9th of November, as possibly some members of the council who might be appointed on the committee if a decision were now arrived at, would not be re-elected at the election on that day.

The suggestion was adopted, and the debate adjourned.

BIRMINGHAM GAS SUPPLY.

PROPOSED PURCHASE OF THE GAS UNDERTAKINGS BY THE CORPORATION.

A Meeting of the Birmingham Town Council was held on Tuesday, Oct. 6—the MAYOR (Alderman Chamberlain) presiding.

Alderman SADLER, pursuant to notice, called attention "to the report of the General Purposes Committee, presented to the council on the 24th of March last, relating to the purchase of the undertakings of the Birmingham Gaslight and Coke Company and of the Birmingham and Staffordshire Gaslight Company, and also to the debate which took place thereon, when it was stated that the annual profit of the former company amounted to £28,000, and that of the latter company to the sum of £67,290, making a total of £95,290; also to the statements of accounts presented at the last half-yearly meetings of the companies, as to the income of the respective companies." In the report of the General Purposes Committee it was stated that the committee were of opinion that, consistent with the utmost fairness to consumers of gas, the corporation might rely upon a considerable immediate profit if the proposed transfer were effected; and also that the estimates upon which the negotiations were based were such that the council might enter upon the acquisition of the property without the slightest additional increase of the rates, and with the absolute certainty, in a short time, of receiving considerable sums in relief of taxation. He wished them to understand from him that at the time the report was made all parties concerned fully believed that what they were stating was correct, from the information which they then had before them. But since then some additional information had been presented to the public, which had caused him to make further inquiries. Amongst other things, it was also stated that the Birmingham and Staffordshire Company had paid their maximum dividend for many years past. It appeared from the report that the property of the two companies had not been valued. Now, he thought it was important, in taking to property of that kind, that a valuation should be made in order to ascertain what the income was likely to be, and also the liabilities. As regarded the liabilities of the Birmingham and Staffordshire Company, they were informed that the annual liabilities amounted to £58,290. If they capitalized that annual sum at 5 per cent., the property ought to be worth £1,164,800. To that amount they had to add the sum of £450,000, which was to be paid for the Birmingham Company, and they should have a property transferred to the corporation which was worth £1,614,800; at least that was the amount to be paid for it by the ratepayers. He ventured to suggest to the committee that they ought to have a valuation of a property of such a large amount as that, and that they should have the property valued by a competent person. He would now direct attention to the amount of profit made by the two companies. He should not take the last half year, as he had stated in the notice, in order that he might not be twitted with ignoring previous half year's profits. If they referred to the report of the General Purposes Committee they would find there a statement of the net profits of the Birmingham Company for the four half years ending December, 1873, and the report of the directors, and if they took, in addition to that, the report of the directors for the past half year, they would find that the average amount of profit on the five half years amounted to £8194 3s. 9d., or £16,389 7s. 6d. per annum. If the corporation purchased the undertaking they would have to provide for interest on £450,000, and that, at the rate of 5 per cent., amounted to £22,500 per annum, leaving for that company alone the sum of £6111 to be paid by the council out of the rates over and above the profits made per annum. In this arrangement there was no provision for a sinking-fund for the repayment of this money. Taking the time for repayment at 100 years, at 1 per cent. upon the £450,000 as a sinking-fund for the first year, the amount would be £4500, and if they added that to the difference which he drew their attention to, then he thought it made £10,611. In regard to the Birmingham and Staffordshire Company the profits for the past five half years amounted on an average to £16,893 9s. 6d. per half year, or an annual sum available for dividend of £33,786 19s. The amount required to pay dividends, as set forth, was £58,290. Add to that the 1 per cent. upon the £1,164,800, and the corporation would have a total annual liability for this company of £69,338 per annum, being a deficit only for this company of £36,152 to be paid upon the actual profits; and the liabilities made by the working of the undertakings of the company would be £46,763, instead of a profit of £20,000 per annum, as estimated. He did not think that the facts he had laid before them would justify them in refusing to refer the question to the committee. He did not ask the council to pledge itself in any way until the committee had reported; all he wanted was an inquiry. He thought that there must be a mistake somewhere, which might be explained; but at all events the reports of the gas companies were sufficient to warrant them in making further inquiries, and to obtain, if possible, more satisfactory information. There was one very curious thing in reference to both companies, that the obligations which the council would enter into upon the present terms were considerably in excess for the half year of any one of the half years of the last five years. The amount of the company's profits was considerably in excess, with one exception. In conclusion, he moved—"That the General Purposes Committee be instructed to consider and to report to the council as early as possible their opinion whether, under the circumstances, it would be advisable for the corporation to take measures with a view to rescind the agreements entered into between the corporation and the gas companies for the purchase of their respective undertakings, and, if so, to ascertain if the companies would be willing to annul the said agreements; or otherwise to advise the council as to the best means of effecting the same."

The MAYOR said that he thought it was highly desirable that the committee should undertake the work which Alderman Sadler wished to throw upon them. In reality, however, the resolution was unnecessary, for the committee would have neglected their duty if they had not already taken steps to inquire upon the matter, and instructed the accountants to examine into the new facts, and report to them, and especially to state if they saw any reason to change the conclusions at which they previously arrived as to the probable future profits to be made by the corporation taking to the gas-works. At the same time, Alderman Sadler could not be supposed to know what they were doing. The town was indebted to him for calling attention to the matter. He thought it would be desirable that they should wait for the report of the committee before discussing Alderman Sadler's statement. At the same time, he did not want that statement to go forth without an understanding that there was possibly a reply to it. He did not want the ratepayers to be unnecessarily alarmed and prejudiced, and he wanted them to understand, at all events, that he was as confident as ever in the advantages which he had previously said would follow upon the purchase. In order to show that he had some reason for this, he should like to call attention to one or two errors into which Alderman Sadler had fallen. There was a confusion in the statement of the matter, which he was sure Alderman Sadler did not intend. In the preamble of the resolution it was stated that, on the occasion of a previous debate, it was said that the annual profit of the Birmingham Company amounted to £28,000, and that of the other company to £67,290. Alderman Sadler should have stated that it was calculated on a previous occasion that those sums would be made by the corporation in the first year that they took to the company. What was said was that they had made very much smaller sums. The purchase did not proceed upon the basis of what the companies had made. The profit actually made by the Birmingham Company for the preceding year to the transfer was £12,000, and not £28,000, as stated in the preamble to Alderman Sadler's resolution; and the profit of the other company was £27,000, and not £67,290. Calculations were laid before the council to show that the corporation could make these larger sums, and some portion of those increased sums was to be made by the savings which the corporation alone could ensure. The companies were not now amalgamated, and the savings mentioned could only be made when they were. Further, it was admitted by the directors of the Birmingham and Staffordshire Company that, during the past half year, there had been mistakes made—or, to put it mildly, there had been mismanagement, which had rendered the concern much less profitable. This would be corrected, and in a short space the concern would retrieve its position. Alderman Sadler stated in the preamble to the resolution that the deficit was £74,881, whilst he now came to the council and stated that it was £46,763. When they found this difference, he thought they might perhaps find his error was even greater; but, putting the deficit as large or small, it was equally unsatisfactory to the ratepayers. He would, however, remind them that it would not come out of the improvement-rate, but the borough-fund rate. The present deficit of the Birmingham and Staffordshire Company would be made up out of the reserve-fund, and that reserve-fund would have to be recouped from the ratepayers or gas consumers in after years; or, in other words, from the pockets of the ratepayers. Whatever deficiency there might be, it was certainly greater in the hands of the companies than in the hands of the corporation. He, therefore, thought that the circumstances now were more favourable than they were before for the transfer of the companies; because they could now save the town, by continuing the negotiations, the loss to the reserve-fund which would fall upon the shareholders of the company; otherwise it would fall upon the ratepayers or gas consumers hereafter. He did not see the wisdom of having the valuation suggested by Alderman Sadler, because they were buying the capacity for producing profit. He still adhered to his belief that the profits which he had before stated to the council could be made if the works were in the hands of the corporation. He referred to the profits which were being made from the supply of gas at Walsall, and said that the mayor of that town, who had a practical understanding of the question, after a careful consideration of the statements made to him, had

expressed his belief that under the management of the corporation the profits which he had stated might be realized from the gas. He should not, even himself, however, come to a positive opinion upon the matter until he had had further reports from the accountants in view of the new information they had obtained. He wanted the ratepayers to believe that it did not necessarily follow because in one exceptional case the Birmingham and Staffordshire Company had made less profits than they expected, that therefore the corporation could not make all that they hoped to make when they had the undertakings under their own management. In reference to Alderman Sadler's calculations about the 1 per cent. sinking-fund, he thought it was a mistake. If they were permitted to repay the capital in 100 years, a sinking-fund of something like 5s. per cent. would be enough to repay the whole of the capital in 100 years; and a sinking-fund of 1 per cent. would repay it in 41 years.

Alderman AVERY expressed a belief that the gas-works, under efficient management, might be made profitable; and, assuming that the corporation would manage the works efficiently, there was nothing which had occurred that disturbed his mind in the least. He had known the companies for a long time, and they had generally divided their maximum dividend. The council must not judge the value of a great concern by a single half-year's results, but be guided by the long period of prosperity which had characterized it. He did not feel the least uneasiness about the matter, and he should be the last person to oppose the resolution, although the committee already had the question under their consideration.

The resolution was then put, and carried unanimously.

BOILER BURSTING.

A series of experiments is being conducted by the Manchester Steam Users Association, at Mr. Beeley's works, Hyde Junction, with a view of determining, by experiments carried out on a large scale, the effect that cutting openings in the shells of cylindrical boilers has upon their strength. Sometimes these openings are introduced at the base of steam domes, and sometimes for carrying downtake flues through the outer shell. In the French or "elephant" boiler these openings are inherent at the connecting necks, between the lower and upper cylinders. In order, therefore, to test the effect of these openings, a full-sized boiler of the Lancashire type, having a diameter of 7 feet in the shell and 2 feet 9 inches in the furnace tubes, has been constructed, and is now undergoing a series of tests, which it is intended to carry up to the bursting-point, to ascertain the ultimate resistance of the boiler.

The first of these tests was made on Wednesday, the 9th ult., when the boiler had riveted to it a small wrought-iron steam dome of the same size and strength as many of the connecting necks now in use in the French or "elephant" and other types of boiler. In preparation for this test the boiler was very carefully gauged in every direction, and six observers took measurements at various points of its movements, under the gradually increasing pressure. In was found that the furnace tubes, which were strengthened with flanged joints at each of the ring seams of rivets, were quite immovable, which is satisfactory, inasmuch as their sufficiency for high pressure was impugned at the recent explosion at Blackburn. The ends of the boiler breathed outwards very slightly, and resumed their original positions as nearly as may be upon the pressure being relieved. The longitudinal seams in the outer shell exhibited no movement. The steam dome or neck, however, burst when the pressure reached 250 lbs. on the square inch, showing that it formed the weakest part of the boiler.

On the following day the boiler was again submitted to hydraulic pressure, the wrought-iron steam dome having been removed, the opening blanked up, and a cast-iron manhole of very substantial pattern applied. At a pressure of 200 lbs. on the square inch the cast-iron mouthpiece ripped asunder, the rent extending right across the plate at each side, and into those adjoining. A wrought-iron raised manhole mouthpiece, with which the boiler was fitted, resisted both tests without the slightest signs of distress, though repeatedly gauged.

The tests show how weak those boilers must be in which manholes are altogether unguarded, while for high pressures, mouthpieces made of cast iron must give place to wrought, and also that the openings at the base of steam domes have a decidedly weakening effect, so that they should always be dispensed with whenever it is possible to do so. It is proposed to push the experiments still further under other conditions, so as to detect any weak points that may still lurk in the systems of construction now adopted for high pressure boilers of the Lancashire type.

In addition to the above, a trial was made of the discharging power of a low-water safety-valve. The importance of an investigation on this subject was suggested by the recent explosion at Hull, which was attributed to shortness of water, though the boiler was fitted with a low-water safety-valve. The experiments seem to show that the discharging power of these valves is not so high as it is desirable it should be, that they will not reduce the pressure of the steam as rapidly as has been supposed, so that their construction requires further consideration at the hands of the makers. It is intended to extend the experiments on this subject to low-water safety-valves of different constructions.

When the investigations are finished, both as regards the strength of the boiler and the operations of the safety-valves, the particulars will be given to the public in detail through the medium of the association's monthly reports.

It may, perhaps, be of interest to state that Sir W. Fairbairn, shortly before his death, wrote warmly approving the idea of the test, and urging that it should be made at once.—*Engineering.*

TROWBRIDGE WATER SUPPLY.—OPENING OF THE NEW WATER-WORKS.—On Wednesday, Sept. 30, the town of Trowbridge was *en fête*—the occasion being the formal inauguration of the water-works, which were commenced in 1873, under the powers of an Act of Parliament obtained in that year. We have no space for an account of the rejoicings, and can only give a brief history of the undertaking, which has been so successfully brought into operation The town of Trowbridge has long suffered severely from the lack of a proper supply of water, and about eight or nine years ago a company was formed there with the object of furnishing a better supply. It was proposed to pump water from a well to be sunk near the town, and about £20,000 was obtained for this purpose. The mains were laid throughout the town, reservoirs constructed, engines and boiler erected, and the well sunk and bored to a depth of 270 feet; but, when the water was obtained, it was found to be brackish and small in quantity. In consequence of this failure the company was ruined, and went into liquidation. The local enterprise was thoroughly exhausted, and the Board of Health in Trowbridge were afraid to undertake the matter; but, in the meantime, the town was suffering severely for the want of water. At length some gentlemen in Cambridge came to the assistance of the Trowbridge people, and a new company was formed, having no connexion whatever with the former company, which had then ceased to exist. The new company appointed as their engineer Mr. Henry Tomlison, the engineer of the Cambridge Water Company (with whom was afterwards associated his brother, Mr. C. Tomlison), and the works now opened have been executed under his directions. The new supply is brought to Trowbridge by gravitation from perennial springs rising from the chalk near Upton Scudamore, which is situate about seven miles from Trowbridge. There have been many difficulties to encounter, and the opposition has been very great, the chief being from the cloth manufacturers of Trowbridge, whose water supply, it was supposed, would be affected. The manufacturers have, however, obtained water compensation from another source. The inhabitants of the town have been waiting many years for a good supply of water, and the success of the present company has been the cause of evoking much gratitude. On the following Sunday, in nearly all the churches and chapels in the neighbourhood, the opening of the water-works was alluded to by the ministers in their sermons.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The iron trade is again in a quieter condition, with the exception of such of the principal foundry establishments as have a fairly large amount of work on hand on account of good contracts recently secured.

Generally speaking there is a moderately well-sustained inquiry for piping and general castings; but there is no particular pressure in any instance.

For some time past, as has on previous occasions been recorded in these columns, there has been an exceedingly brisk demand for brasswork. There is a steady call for high-pressure meters of the Siemens principle of construction, a considerable number having been sent abroad to various European, South American, and other water-works, although I understand they are scarcely so largely used in this country as they once were, some engineers preferring to recommend the adoption of meters made on the low-pressure principle.

The coal trade is somewhat irregular. Engine fuel and slack are difficult to dispose of, but the steam coal trade is up to the average, and the house coal department has improved considerably of late. The railways are just now taking an increased tonnage, both to London, the east coast towns, and road-side stations. Pig iron is not materially altered in any respect since the date of my last weekly report.

The Handsworth Woodhouse Local Board are in negotiation with the Sheffield Water-Works Company for a supply of water, which the company propose to furnish in one of two ways, in both instances by meter, and with a fixed minimum consumption per 24 hours—100,000 gallons at 7½d. by one scheme, and 120,000 gallons at 1s. 0½d. by the other—with an intermediate tank, &c. Mr. Ayres, the company's distribution engineer, has the matter in hand.

At a special meeting of the Rotherham Town Council, on Thursday, there was a long discussion on the question of water supply. In the course of the conversation a statement was read which had been compiled by Mr. Mansergh, the engineer, showing that there were the following sources of supply existing, with the daily supply in gallons:—Pinch Mill, 150,000; Ulley Reservoir, 880,800; Aldwark Spring, 60,000; Dalton Brook, 464,620; Wellgate (at present condemned), 1,563,420, or alternatively 1,341,220. The present daily consumption is 629,681 gallons. A series of statistics was also put forward, showing the probable cost of utilizing each of these sources of supply.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The usual quarterly meeting of the South Staffordshire iron and coal trades was held at the Town Hall, Birmingham, on Thursday last, and was very numerously attended.

Prior to the general meeting of the trade, a private meeting of a few leading firms was held, at which it was determined to reduce the price of branded iron £1 per ton, or to the basis of £11 per ton for bars. The announcement was received on 'Change with general satisfaction, and it is asserted that Belgian iron is now practically shut out of the market. Second quality bars were little changed in price, makers having already lowered their quotations to the lowest possible limit, in order to keep their mills in operation. The standard for unmarked bars remains, therefore, £10 per ton, though in a few cases orders have been accepted at £9 15s. per ton. Hoops are rather weaker at £11 15s. to £12 10s. Common rods and gas strip are offering at £10 10s. at the works. A decided revival of business is now confidently anticipated. The wages of finished iron-making operatives are now reduced 1s. per ton and 10 per cent. respectively. Puddlers wages will now be at the rate of 10s. 9d. per ton. The reduction is based upon the result of the accountant's investigation, which shows that the average selling price of iron in the North of England and South Staffordshire, during the past six months, has been £10 15s. 8d. per ton. In addition to the reduction of colliers and ironworkers wages, the scale of remuneration of labourers, engineers, and furnacemen will be proportionately lower.

In pig iron, hot blast native all-mine is from 5s. to 10s. lower, at £5 5s. to £5 10s. per ton. Medium and common qualities, however, are tolerably firm at £3 10s. and £3 5s. respectively; cold blast pigs are in good request, and producers can dispose of their makes without difficulty. There are now 70 furnaces blowing in the South Staffordshire and East Worcestershire district, and others are being prepared for blast, the prospects of business in this branch of the trade are decidedly more encouraging.

The coal trade is without special feature, the supply is plentiful, and prices are a shade weaker. Lower quotations for forge coal have been received from the Cannock Chase district, but the deep coal is still firm at late rates; furnace coal is now selling at 11s. per ton, and common qualities at 9s.

The rate of wages paid to thick coal colliers is now 4s. per day of eight hours, and this is a higher scale than they ever received prior to 1871.

Coke is rather easier, and is in abundant supply.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

In the Manchester market a good general business has been done in the coal trade during the past week. For house coal there is now a very brisk demand, and stocks are steadily decreasing. Good furnace and engine coal also meet with a ready market at full rates, but supplies are generally quite equal to the demand, though not plentiful. Gas coal has been rather more difficult to obtain since the Wigan strike, but neither in this nor other descriptions of fuel has there been any material alteration in prices in the Manchester market during the past week, gas coal at the pit mouth being worth from 12s. to 13s. 6d. per ton, according to quality.

Additional efforts are being made to push best South Yorkshire coals in the Manchester district, instead of sending them to London as heretofore, Manchester being really the natural market for the best coal from that field. Direct agencies are now being appointed in Manchester for some of the large collieries in the Barnsley district, and this extension of the high-class coal business in the above city may possibly become a feature in the trade.

In West Lancashire the stoppage of most of the pits, although it has prevented the colliery proprietors coming into the open market, has not yet occasioned any inconvenience to their regular customers, the stocks on hand being sufficient to meet the requirements for the present, and prices are unchanged. There is a general belief that the strike will come to a speedy termination, as it is not probable the men will receive any support from the Miners Association. Some of the smaller colliery proprietors, as I anticipated in my last report, have not held out; but, with about one exception, all the large firms have adhered to their notices.

The coke trade is not quite so active, but prices are unchanged.

In the iron trade, although there has been a fair amount of activity, there was an absence of any fresh business of importance until the result of the two quarterly meetings was known, but now that prices have been reduced £1 per ton at the Staffordshire meeting, there is a probability that the large number of specifications which have been held back may find their way into the market, as prices may now be considered as practically settled until the next spring meetings. Although as regards pig iron much business will not be done for a few days until it is seen that the reduction in manufactured iron will check the advancing tendency caused by the pressure to ship before the close of the navigation, still a decidedly healthier and more active trade may now be looked

for during the winter months. Prices range about as under: Middlesborough pig iron, delivered in the Manchester district, No. 1, 80s.; No. 3, 75s.; No. 4 foundry, 73s.; No. 4 forge, 68s.; mottled, 67s.; white, 65s. per ton. Staffordshire bars, delivered, £9 15s. to £10; and puddled bars, £6 12s. 6d.

The various works continue tolerably busy, and both forge proprietors and founders are generally well off for orders. The blast-furnaces in the neighbourhood of Wigan have been damped down in consequence of the men having refused to accept the reduction of 10 per cent., which I noticed in a previous report, but the matter was expected to be settled in the course of a few days.

COAL AND GENERAL TRADE OF THE NORTH.

(FROM OUR OWN CORRESPONDENT.)

The most important circumstance in connexion with the coal trade of the North of England of last week was, that the Northumberland pitmen, having refused to accept a reduction of wages, the owners of the collieries in the trade gave them notice on Saturday of a termination of their engagement in a fortnight. Under these circumstances, without an arrangement could be made to submit the points in dispute to arbitration, a strike would follow. It is understood that the leaders of the pitmen's union did not agree with the men in their determination not to submit to a reduction, and there is every probability that this dispute, like the Durham one, with regard to wages, will go to arbitration. The arbitrators mutually agreed upon by the Durham coalowners and their men would commence their sittings in the Central Station Hotel, Newcastle, yesterday, when evidence would be given by the employers of the necessity of the reduction of miners wages in the county of Durham. The men will state their case, and the arbitrators will give their decision. In the meantime, the condition of the coal trade is unaltered. Household coals are in fair demand; gas is not very much inquired after; and manufacturing coals remain in the same state as they have been for some months now—*i.e.*, without a market; and offering at very low prices. In the Northumberland coal-field the colliery owners are only working the steam coalpits from day to day until they see how the dispute in the trade will get settled. Prices in the steam coal trade, as a matter of course, are stiffening, as merchants are anxious to get what orders they have on hand away, lest there should be a strike.

The iron trade of the North of England, though presenting no marked features of change, still appears to show generally an improved and more hopeful tone. There is more inquiry for the various classes of finished iron. The pig iron trade has been rather quiet, however; though foundry iron for export showed some improvement in demand, and prices were firmer. Some good orders for forge have been placed, and a fair amount of iron is being shipped to the Continent.

The chemical trade showed no improvement last week, but was a dull and sluggish market, though a good few chemicals were shipped to the south and to the Continent. The market has been a good deal in the hands of the middle men during the past ten days, who have been giving larger discounts than the manufacturers themselves were inclined to agree to. The general manufacturing trade has been tolerably satisfactory.

SHEFFIELD GAS COMPANY.—The accounts of the Sheffield United Gas Company for the past year, to be presented at the meeting next Monday, show a profit of only £18,266, which necessitates a draw on the reserve-fund to the amount of £2674.

EXPLOSIONS OF GAS.—At Lymm (Cheshire), on Monday, the 5th inst., an explosion occurred on the premises of Mr. Brown, grocer, Booth Hill, by which considerable injury was done to the premises, and two women were seriously burned. On Tuesday, the 6th inst., an explosion occurred in Duke Street, Cardiff, at the house of a hairdresser, named Sweeting, who was severly burned, and his premises much injured. In both cases the accidents appear to have arisen from the taps of the burners being carelessly turned off.

BRISTOL PUBLIC LIGHTING.—The gas company have replied to the Sanitary Committee that, as the pecuniary difference involved in the acceptance of their offer is comparatively small, they will consent to the adoption of the proposal contained in their letter of the 25th ult., as mentioned in the last JOURNAL. The committee, at their meeting on the 8th inst., resolved to report this acceptance to the council, and to recommend that body to agree to the public lighting contract for three years upon the terms named.

BLAENAVON.—LIGHTING THE TOWN WITH GAS.—On Thursday last, considerable excitement prevailed in this town on the occasion of the streets being lighted with gas-lamps for the first time. The lamplighter met with quite an ovation on going his rounds, being followed by a large crowd, who cheered him lustily as he performed his duties. Independently of this, and in recognition of the event, the church bells were rung, and the local volunteers, accompanied by their band, turned out and paraded the streets. In the evening a public supper was held at the White Horse Hotel.

BARBADOES GAS-WORKS.—The contract for erecting gas-works in the city of Bridgetown, Barbadoes, has been entrusted to Messrs. William Blews and Sons, of Birmingham. The directors report that the bulk of the gas apparatus has been delivered at Bridgetown, and that the erection of the works is proceeding satisfactorily, under the superintendence of the resident engineer. The gas-tank and holder work have been executed for the contractors by Messrs. Piggott and Co., of Spring Hill, Birmingham. The population of Bridgetown is over 50,000, and the price to be paid for gas is 15s. per 1000 feet.

EXPLOSION OF GAS AT LIVERPOOL.—About two o'clock in the afternoon of Tuesday last an explosion of gas occurred in St. Philemon's Church, Windsor Street, which has only been opened a few months. A number of workmen were employed at the time of the occurrence, fitting up the school-rooms underneath the church. Fortunately they escaped without injury, although a portion of the ceiling was blown down, the windows broken, and other damage done. The explosion occurred immediately underneath the organ and choir, which have been considerably injured, the organ being rendered useless. The cause of the explosion has not been ascertained.

ATTEMPT TO DESTROY THE BRADFORD GAS-WORKS.—The chief constable of Bradford, by instructions of the Corporation Gas Committee, issued placards, on Monday, Oct. 5, offering a reward of £50 for information which should lead to the detection and conviction of those who, during the night of Tuesday last, attempted to cause an explosion of gas at the Mill Street works, thereby endangering the lives of the inhabitants. It would not conduce to the calmness of the public mind, nor is it to the interest of the inhabitants, to be informed of the manner in which the diabolical attempt to destroy life and valuable property was contemplated, and they will now, we are convinced, be anxious above all that the committee and the police authorities shall be unremitting in their efforts to detect and punish the miscreants who, from pure wantonness, have planned this outrage. Had not there been a timely discovery of the fact that valves at the works had been tampered with, the results must have been disastrous. It would, we believe, have been impossible to confine them to the immediate premises, and the damage and destruction would have been widespread. There had, it is rumoured, been a misunderstanding between some of the officials and a few of the stokers respecting wages, but we are unwilling to believe that such a trifling cause of disagreement would have tempted any man to commit the wicked act. In most gas-works the valves are so protected that the men employed cannot reach them, and we understand that the Gas Committee, as a precaution for the future, have determined to render those under their care equally secure.—*Bradford Daily Mail.*

LIVERPOOL WATER SUPPLY.—THE CONSTANT SERVICE SYSTEM.—At the meeting of the Water Committee, on the 5th inst., the chairman (Mr. Wilson) made a statement as to the results and cost of the present system of water supply. He said he had compared the returns of the quantity of water supplied to Liverpool during the last eight weeks, with the returns of the quantity supplied during the corresponding eight weeks of last year, and he found that the quantity supplied during the last eight weeks was 17 million gallons less than the supply of the corresponding period last year. There had thus been a saving of more than 2 million gallons per week. This year the corporation were supplying 2 million gallons more per week for trade purposes than last year, and 2 million gallons more per week to customers; so that, in reality, there had been a saving of 6 million gallons per week during the last eight weeks. This was the result of the application of a constant service to a small part of Liverpool; and if its application to other parts was attended by similar results, there would be a total saving of 24 million gallons of water per week, which was all that was contemplated by the promoters of the system. The committee might congratulate themselves that a saving of water was taking place, and that the application of a constant service promised to be as successful as it was originally expected it would be. Mr. Hughes asked what the cost of the application of the system would be. The chairman said that in looking at the cost there were two things to be considered. They must save the water at any cost, and all that they were expending came out of revenue. He believed the ultimate saving to revenue would be equal to £20,000 per annum. Mr. Hughes: I fear the expenditure will be in excess of the money voted. The Chairman: That is not so; we are considerably below the amount of our estimates.

SUB-WEALDEN EXPLORATION.—The eighth quarterly report just issued states that little progress has been made in the work during the past three months, in consequence of the inability to procure lining tubes of the required size in sufficient quantity. The increased favour in which the diamond boring system is now held has caused a great demand for them, and they are specially manufactured by an eminent Birmingham firm. The new pipes are required for the difficult process of enlarging and lining the bore-hole to the diameter considered requisite before attempting to withdraw the broken rods, &c. Mr. Willett says: "The engineers have no doubt whatever of their ultimate success, and as the extraction of the rods is not a matter involving expenditure of the funds, we can only regret the loss of the long summer days, and take comfort from the assurance that after the enlargement and lining is accomplished there will be a much better prospect of obtaining the desired depth of 2000 feet than there was a year ago that we should reach the half distance, provided the requisite fund is forthcoming." He is anxious to dispel what he terms the "delusion" that no more money is required from the public in consequence of a Government grant to the work having been obtained. He states that the Chancellor of the Exchequer, with laudable foresight and prudence, has promised to assist on certain conditions, to do which "we must spend £400 in boring, tubes, &c., bore 100 feet, which will cost £200, and then, and not till then, we can draw £100 from the Exchequer, and so continue on claiming £100 for every 100 feet actually explored." The third and last year of the tenancy for carrying out the work has been entered on, and therefore the necessity of speedily resuming the operations is at once seen. The financial position is cheering, the present balance being £594 7s. 9d. The honorary secretary says: "We are much indebted to Mr. William Topley, F.G.S., for having consented to visit Belfast, there to read our report, and make personal application for additional aid from the British Association, and we are greatly encouraged by the response and grant of £100. The kind promise of Sir Charles Blunt to give £50 on our reaching 1000 feet has been faithfully performed; so also will Mr. Warner's promise of £300 when we reach 2000 feet. In scientific research it has often occurred that the benefits accruing have been indirect and unexpected by the promoters. Not only have the rich beds of gypsum been made known, and, in consequence, are now in actual process of development, but the new facts ascertained by our work have thrown some considerable light, and that of an encouraging nature, on the problem of the feasibility of constructing a submarine tunnel between England and France. The motives which actuate our friends to subscribe are various and sometimes novel. One writes, 'I enclose my mite. Besides the objects stated, a shaft is doubtless a safety-valve against earthquakes.'" The report concludes by thanking the London, Brighton, and South Coast and the South-Eastern Railways for their assistance in the work, the latter company having, in addition to granting other privileges in the use of their line, forwarded a check for £50. The kindness of the Earl of Ashburnham, the Rev. T. Partington, and many others, is acknowledged, and the honorary secretary concludes with an earnest hope for further encouragement, and that results will prove that their labour has not been in vain.

SEAHAM HARBOUR NEW GAS-WORKS.—A correspondent writes:—"The week before last, large and very commodious new works were started for the manufacture of gas for the supply of Seaham Harbour. For many years past the town has been supplied with gas manufactured at the old works, situated at the other end of the town, and hitherto belonging to Dr. Smith, of Seaham, to whose energy and enterprise the town was originally indebted for its gas supply. About twelve months ago the fact forced itself upon the inhabitants that the existing works were quite inadequate to keep pace with the rapidly increasing requirements of the town, and further extensions were next to impossible, owing to the want of space on the site. A limited liability company was therefore formed with a view to purchasing Dr. Smith's undertaking, and erecting new works upon a more convenient spot, adequate to the future supply of the town. This has now been done, and the greatest praise is due to Mr. Emmerson, chairman of the company, and also to Mr. Wright, their legal adviser, for their spirited action in the matter. The new works were designed, and the plans prepared, by Mr. Wm. Ford, gas engineer, Stockton-on-Tees, upon whom they reflect the very highest credit. The construction was ably superintended by the company's manager, Mr. James Whyte, assisted in its earlier stages by Mr. Campbell. A brief description of the works may not be uninteresting. They are situated at the extreme south end of the town, and occupy about an acre and a half of ground, around which is built a very neat boundary wall. The various buildings are ranged along the boundary walls, and seem to have been designed with a view to architectural effect, as well as to usefulness and economy. A spacious yard is left in the centre, which will be sown out in grass, interspersed with ornamental flower-plots. The retort-house is a neat and well ventilated building, about 106 feet long by 42 feet wide. It is spanned by a substantial wrought-iron roof, and contains ten beds of retorts, with five in each bed. The flues from these beds are conducted into an octagon chimney, which rises from the centre of the retort-house to a height of about 80 feet. It is very nicely built of white corner brick, with stone collar and cap. A branch line of the Londonderry Coal Railway is carried through the retort-house at an elevation of about 10 feet from the floor level, and by this means the coal is at once conveyed into depôts immediately in front of the retorts, thus dispensing with much manual labour and consequent expenses. From the retort-house the gas is carried through 12-inch pipes to a set of diagonal condensing-pipes, through which it passes to the exhauster. The exhauster and steam-pumps are within the one building, and next to it is the boiler-shed, containing two large boilers. From the exhauster the gas is forced through either one or two wrought-iron scrubbers, as may be found necessary. Each scrubber is about 5½ feet in diameter, and 16 feet high, and both are placed upon substantial brick pedestals. There are four 12-feet dry lime purifiers, each containing four trays. The purifier-house is a large airy building, about 36 feet square, having on the one side a fresh lime store, about 26 feet long and 20 feet wide, and on the other side a store wherein to place the spent lime from purifiers. A large station-meter has been erected capable of correctly registering 10,000 cubic feet of gas per hour. The meter-house is about 16 feet long and 20 feet wide. The gasholder is about 80 feet in diameter and 22 feet deep. From this holder it is passed through a regulator or governor, and

thence into the town, through a 12-inch main pipe. The governor-house is about 12 feet square, and stands near the main entrance gateway. On the opposite side of the yard from the purifying-house there is built a range of offices, stores, and workshops. These buildings are erected in harmony with the design carried out in all the other erections, and the whole has a very pleasing effect. The entire work has been so arranged and carried out as to admit of its manufacturing, purifying, and storing power being extended to nearly twice its present capacity should it be found necessary at any future time. A stone has been inserted in front of the retort-house, immediately above the main doorway, with the names of the chairman and directors of the company, a fitting tribute to the zeal with which they have acted in so speedily making successful preparation for the adequate supply of gas during the coming winter. The nominal capital of the company is £15,000, subscribed for in shares of £250 each. Amongst the promoters of the company are the Marquis of Londonderry, J. B. Emmerson, Esq. (chairman), Thos. Elliot, Esq., Samuel Ditchfield, Esq., John Watson, Esq., H. B. Wright, Esq., and others."

Register of New Patents.

414.—ABEL, C. D., Southampton Buildings, London, "*Improvements in gas motor engines.*" A communication. Provisional protection only obtained. Dated Feb. 2, 1874.

This invention relates to improvements in gas motor engines of the kind described in patents, Nos. 434 of 1866, and 2245 of 1867. They consist chiefly in the construction and arrangement of a crank, and levers, and rods connected thereto for working the slide, and for partly moving the piston, such crank being either moved by the engine-shaft or left at rest, according as a pawl mounted on it is engaged with or disengaged from a ratchet wheel on the engine-shaft. The engaging and disengaging of the pawl is effected by the movement of the piston in its descent and ascent, and is also controlled by a governor in such manner, that when the engine-shaft is revolving with sufficient speed the expenditure of gas is stopped. The slide is arranged for the admission of the combustible gaseous mixture, and of an igniting flame to the cylinder, and for the emission of the products of combustion from the cylinder by one and the same passage.

426.—BENSON, M., Southampton Buildings, London, "*Improvements in pipe-tongs and cutters.*" A communication. Provisional protection only obtained. Dated Feb. 3, 1874.

The first part of this invention is accomplished by providing the stationary jaw of the tongs with a slot, furnished with a sliding adjustable block or hinge of metal to which the adjustable jaw is attached to the front part of the block usually by a hinge-shaped joint, or any other analogous form of joint may be used. The screw for adjusting the jaw passes through the end of the slot made in the stationary jaw, and is made to act on the back end of the block for adjusting the jaws to suit any size pipe. The end of the adjusting screw may simply press on the hinge block without being attached to the block, or if desired a recess may be bored into the back end of the block for receiving the end of the screw, and held there by a pin, but in the meantime leave the end of the screw free to revolve in the block. By thus uniting the screw and block the adjustable jaw of the tongs may at all times be held stationary, and adjusted to the stationary jaw to suit any size pipe. The hinge block will be held in the slot by flanges on each side or end of it to prevent it slipping.

The second part of the improvement is constructing the tongs for cutting pipes. One method of doing this is by providing the adustable jaw with a suitable shaped cutter or wheel usually employed for cutting pipes, fitted into the end of the adjustable jaw, and held there by a pin, screw, or wedge as the case may be. Instead of combining the cutter with the jaw, an independent jaw may be constructed for cutting pipes, and united to the hinge block in the slot in the manner described for adjusting the jaws to suit any size pipe required to be cut.

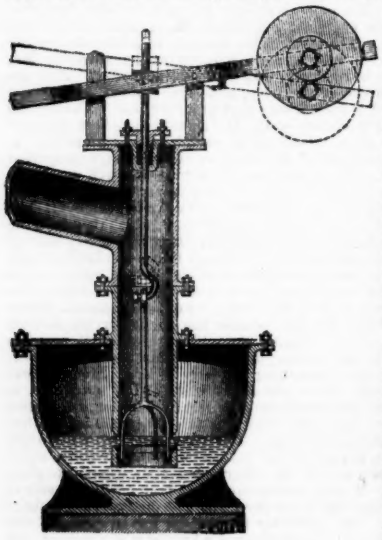
The tongs may be made of iron, steel, or malleable cast metal, and the working part properly hardened to prevent undue wearing by use.

430.—DEMYNTER, C., Oxford Street, London, "*A new hydrocarbon purificatory apparatus for illuminating gas.*" Provisional protection only obtained. Dated Feb. 3, 1874.

This apparatus is so constructed that the gas having entered at one end follows a regulated motion by passing through partitions perforated alternately on opposite sides of the chamber, compelling the gas to take a serpentine course over a liquid hydrocarbon bath, and makes its exit, saturated with the volatile particles of the fluid. The successive supply of the liquid is effected by a mariotte pipe or flask, with a branch leading to a chamber above.

467.—CAFFALL, R. M., 75, Fleet Street, London, and THOMAS, A., Alton, "*Improved means of and appliances for effecting the automatic sealing of hydraulic gas-mains, and for removing the pressure of gas on retorts at pleasure.*" Patent dated Feb. 5, 1874.

This invention relates to improved means of and appliances for effecting the sealing of the dip-pipes in hydraulic gas-mains, and for removing the pressure of gas on the retorts at pleasure, and consists in the arrangement and employment of a dip-pipe with a loose extension piece of pipe, the top edge of which is capable of being raised so as to come in contact with the lower edge of the dip-pipe, or lowered beneath the surface of the liquid in the hydraulic. The top of the extension piece of pipe may be flat, recessed, or chamfered upon its upper edge to meet a correspondingly shaped edge upon the bottom of the dip-pipe, which is a fixture. There are guides attached to the inside of the extension piece, which serve to maintain it in its proper relative position to the dip-pipe. Guides may, however, if preferred, be placed on the outside of the extension piece, and either attached to it or the dip-pipe. Both the dip-pipe and the extension piece are open at bottom, and the latter is wholly or partially submerged in the liquid in the hydraulic, while the bottom edge of the former just reaches the surface of the liquid, or by preference is slightly raised above it.



To effect the raising or lowering of the extension piece, a rod is attached thereto, and passes through a stuffing-box at the top or cap of the dip-pipe. The rod is pivoted to a lever of the third order, the fulcrum of which is a standard fixed to the cap of the dip-pipe. Another standard on the opposite side acts as a guide to the lever, and keeps it from swerving unduly when operated upon. The lever has a rod or chain depending from one of its ends, while the opposite is furnished with an adjustable counterbalance weight. The rod fastened to the extension piece is by preference made in two parts, attached to each other by a hook and eye joint. The lever has attached to it a swivel piece of iron tapped through its centre, and through which the screwed end of the rod passes, the top end of the rod being squared so as to admit of the application of a wrench to turn it round. By this means the extension piece may be adjusted in height, or raised so much as to convert it practically into an ordinary dip-pipe.

According to another method, the extension piece is formed with a ball joint pivoted in the middle, and furnished with an orifice through its centre, but at right angles to the direction of its axis. The extension piece is raised or lowered by a rod, but in this case it is operated upon by means of a lever of the first order.

By another plan, the extension piece may be made in two or more flaps, hinged to the dip-pipe, and opened or closed by means of a rod attached thereto. The opening of the flaps produces a clear gas way, while the closing of them effects a seal.

431.—DENNIS, T. H. P., Chelmsford, "*A new or improved water-waste preventer.*" Patent dated Feb. 3, 1874.

This invention consists of a cistern having two compartments, the one for receiving the direct supply of water from the main or other source through an ordinary ball-valve, the other, or service-boot, for containing any requisite flush of water that may be desired. A small hole in the partition connects the water supply to the two compartments. The water is supplied from the service-boot to the service-pipe by means of a syphon, having a plunging disc or plate so fitted round its short leg that upon giving motion to it by means of a suitable lever, &c., the whole contents of the service-boot, or only a portion thereof, may be discharged into the service-pipe at pleasure, whilst, by means of certain arrangements, no more water than the cistern is arranged to get at one flush can possibly be obtained.

486.—FORD, S., South Lambeth, Surrey, "*Improvements in prime movers actuated by the explosive force of mixtures of gases.*" Patent dated Feb. 6, 1874.

This invention relates to the adaptation of the rotary class of engines to the utilization of the explosive force of gases. The form of engine considered most suitable for this purpose is that in which a leaf or leaves constituting the piston is or are adapted to a cylindrical drum rotating within a cylinder, the piston or pistons being arranged to act in connexion with a fixed abutment provided with inclined planes which cause them to slide in and out in a slot formed in the drum. The cylinder is surrounded with a water jacket, and water spaces are also formed within the drum, and water circulates round the cylinder and also through the drum in order to prevent their overheating. In connexion with a rotary engine adapted as a gas-engine a chamber is employed in which the carburetted hydrogen or other inflammable gas employed is mixed with atmospheric air in due proportions before being admitted to the cylinder. In some cases, and especially when the explosion in the cylinder of a rotary engine is to be effected by means of a jet or jets of gas-flame, a sliding, rotary, or partially rotating valve, furnished with suitable ports to regulate the admission of gas to the mixing chamber, is employed to admit the explosive mixture into the cylinder, and to bring into action the jet or jets of gas-flame to effect the explosion. When the explosion is to be effected by means of electricity, the valve is dispensed with, and instead thereof in the piston drum grooves or recesses, corresponding in number to the leaves or pistons, are arranged and so proportioned that during the rotation of the piston drum each groove or recess shall serve to establish a communication between an inlet port and the space behind the piston for a length of time sufficient to permit a suitable quantity of the explosive mixture to enter the cylinder.

Another part of the invention consists in an improved arrangement of gas-burner for the ignition of the explosive mixture in the cylinder, applicable to other forms of gas-engines besides the rotary. In connexion with the gas-burner is a valve for admitting the gas, kept open by means of a spring until the ignition of the explosive mixture takes place, when the pressure arising from the explosion closes the valve against the resistance of the spring until the pressure within the cylinder becomes sufficiently reduced to permit it to reopen the valve. The sudden closing of the valve prevents the driving back of the gas in the supply-pipe of the burner, and so the bellows or other gas-forcing apparatus usually employed can be dispensed with.

Another part of the invention consists in applying a relief-valve opening inwards by the pressure of the atmosphere, and admitting air into the cylinder at such times after an explosion as a vacuum may be formed behind the piston.

And another part of the invention consists in the employment of a self-acting valve opened by the exhaustive action of the piston in order to admit the gas to the mixing-chamber when required, but closed by a spring or weight in order to cut off the supply of gas when the engine is stopped, without the main valve or tap being closed, thus avoiding the danger of an escape of gas, which may in some cases happen.

488.—KAYSER, C. W., Sheffield, "*Improvements in or connected with steam, hydraulic, blowing, pumping, or water engines.*" A communication. Provisional protection only obtained. Dated Feb. 6, 1874.

In carrying this invention into practice the cylinder of the engine is constructed and arranged or made to form a bed-plate, and has all other parts attached to it, the guides being united with one of the lids, and the bearing for carrying the fly-wheel or driving-shaft with the other. Between the guides the piston moves to and fro attached to the crosshead, the latter being united at each end by connecting-rods with the cranks fixed on the driving-shaft. For bolting the machine against the wall or foundation, brackets are fixed on the cylinder alone, or on the cylinder and to one of the lids, according as the construction of the machine, whether horizontal, vertical, or of any other description, requires.

499.—UNDERHAY, F. G., Clerkenwell, "*Improvements in bib-cocks or cocks for drawing off water.*" Patent dated Feb. 7, 1874.

This is the invention of a valve closing against the flow; it is balanced by a cupped piston, and closed against its face by a spring. The closing is controlled by a disc on the valve-stem beyond the piston, fitting very nearly a chamber in which it works.

506.—ATKINS, F. H., Fleet Street, London, "*Improvements in filters for ships tanks and other purposes.*" Provisional protection only obtained. Dated Feb. 9, 1874.

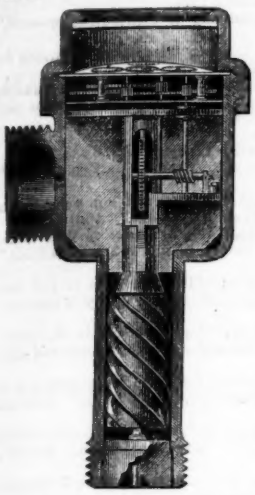
This invention has first for its object improvements in filters for ships tanks, by the application thereto of solidified carbon filtering-blocks mounted in plates or frames as described in patent dated Feb. 14, 1873, No. 556, and also in enamelling or lining the chamber or reservoir containing the filtered water with white enamelled, glazed, encaustic, or vitrified tiles or slabs, or with enamelled metal plates or chambers, in order to preserve the filtered water in a perfectly pure state in any climate.

531.—JOHNSTON, W., Lima, Peru, "*Improvements in machinery or apparatus for compressing air or gases.*" Patent dated Feb. 11, 1874.

These improvements consist of an apparatus for compressing air by the employment of a series of cylindrical chambers of diminishing capacities, each being partially filled with water, mercury, or other fluid, which by the oscillation of the chambers on a fixed axis acts as a piston or pistons, and by means of suitable valves and connexions drives the air in an increasing compressed state through the whole series of chambers into the last or receiving vessel, from which it passes through the axis of the apparatus to be used as required.

500.—Everett, G. A., New York, U.S.A., "*Improvements in liquid-meters.*" A communication. Patent dated Feb. 7, 1874.

This invention has for its object improvements in liquid-meters, whereby a simple and efficient meter is produced, whilst but little resistance is offered to the passage of liquid therethrough, and relates to that class of liquid-meters in which a measuring-screw is employed. For this purpose a case or chamber is employed, having suitable inlet and outlet orifices, which are capable of being readily connected by union joint or otherwise with the service and supply pipes.



In this case or chamber is mounted a frame, which is preferably formed of a central portion or boss, having four ribs or wings connected therewith standing at or about right angles to each other. At one end of these, ribs or wings are connected to a circular plate accurately fitting the interior of the case or chamber, and the four ribs are also formed to fit the interior of such case or chamber, so as to support the frame firmly in position. On the circular plate is mounted a suitable counting apparatus, to which motion is given from the measuring apparatus by means of a worm acting upon suitable gearing carried by the cross frame, and giving motion to the first counting-spindle.

The measuring apparatus consists of a screw, formed by preference of vulcanite or hard rubber, and mounted on a shaft or spindle having a worm fixed thereon, which worm actuates the counting mechanism as before described.

The measuring-screw is made to fit the interior of the case or chamber as closely as possible without touching it. One end of the spindle of the measuring-screw is received into a bearing formed for it in the boss or centre of the cross frame, and the other end of the measuring-screw is by preference formed with a hole to receive a spindle, which is capable of adjustment by being screwed through a central portion or boss carried by an open framework or support fixed at or near the outlet end of the interior of the case or chamber, a lock-nut being employed to retain such spindle in the desired position when once adjusted.

Some of the ribs of the cross frame carrying the counting apparatus are perforated to admit a free flow of water therethrough, so as to equalize the distribution thereof. The counting apparatus and dial are enclosed by a cover screwed on to the case or chamber, and the liquid has free access thereto, thereby obviating the necessity for the use of a stuffing-box for the first counting-spindle to pass through; and in order that the water may be enabled to freely pass in amongst the counting apparatus, and yet that no dirt or grit shall pass with it, the circular plate of the cross frame is perforated with a number of holes corresponding with other holes in the back plate of the counting apparatus, and the holes in the circular plate are covered with very fine wire gauze or other suitable material.

The measuring-screw is formed with a solid central portion, around which are arranged a number of blades or threads, and the boss of the cross frame is spread out at the end near the measuring-screw, so that it shall direct the water towards the blades or threads, and prevent it impinging against the end of the solid portion of the measuring-screw.

A grating is applied to the inlet orifice, to prevent any solid matter passing into the meter large enough to interfere with its correct action.

534.—Wilson, M., Brixton, Surrey, "*Improvements in stench-traps.*" Patent dated Feb. 11, 1874.

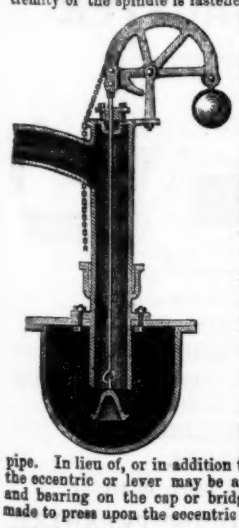
This improved stench-trap is constructed with a bell or cup, which is separate from the perforated cover or grating of the trap, and is secured in its box or body; it is also in some instances provided with a ball of cork or other suitable material, to more fully ensure the sealing or closing of the pipe.

565.—Hazeldine, F., Lant Street, Southwark, "*An improved valve or tap for liquids and other purposes.*" Patent dated Feb. 14, 1874.

The feature of novelty of this invention consists in constructing a valve by means of a hinged plate forced against its seat by a screw fitting into a slotted groove, and working through the outer casing of the valve.

566.—Box, W. W., Gas-Works, Crayford, Kent, "*Improvements in apparatus used in the manufacture of gas.*" Patent dated Feb. 14, 1874.

The object of this invention is to render unnecessary the use of liquid in the present hydraulic main, and with this view the cap on the top of the dip-pipe above the bridge-pipe is furnished with a stuffing-box, through which passes a spindle. This spindle is attached at one end to a lever, or by preference to an eccentric supported on a fulcrum or standard, and provided with a counterbalance weight, the other end of the lever or opposite side of the eccentric having a chain, rod, or cord attached, whereby the apparatus is acted upon. To the lower extremity of the spindle is fastened a hollow or solid cone, made with a flange or projection at or near its base, the flange being turned true. The bottom of the dip-pipe is also turned or otherwise fashioned to a true circle with a V-shaped, semicircular, or other suitably formed edge. The cone and dip-pipe are thus made into a valve and seat.



The apparatus is used in the following manner:—When the retort is not in action the weight attached to the eccentric or lever, if one be used, causes the conical valve to rise and bear against the edge of its seat or bottom of the dip-pipe, thus closing any communication between the retort and conducting main, but as soon as the retort is charged the attendant pulls down the rod or chain fastened to the eccentric or lever, which, acting through the intervention of the spindle, depresses the valve, and opens a way for the free passage of the gas from the retort to the main, the passage being maintained so long as the rod or chain is kept down by the hook or other appliance with which it is furnished, being attached to the retort-lid or other fitting above the mouthpiece.

The valve, although by preference made taper or conical, may be of any other suitable form, and the spindle may be guided at the lower part by a guide-bar fastened to the dip-pipe. In lieu of, or in addition to the counterbalance weight before mentioned, the eccentric or lever may be acted upon by a spring, either attached to itself and bearing on the cap or bridge-pipe, or fixed to the cap or bridge-pipe and made to press upon the eccentric or lever.

567.—Richards, W., Burton Road, Brixton, "*Improvements in regulating the supply of fluids and liquids for the manufacture of illuminating gas, and for the apparatus employed therein.*" Patent dated Feb. 14, 1874.

The first part of these improvements refers to regulating the supply of water or steam or controlling the production of hydrogen and other gases produced by the decomposition of water, commonly known as water gas, and controlling or regulating the supply of hydrocarbons when mixed with water gas for the purpose of obtaining light.

The materials proposed to be employed by preference for the manufacture of gas are water and petroleum or its spirit, although any other liquid hydrocarbon or oil may be used which can be decomposed by heat, and the vapours or gases from which will combine with the gases obtained by the decomposition of water.

The retorts employed are three or more, heated to a suitable temperature, one of them being by preference made of fire-clay, as this material is the most suitable for withstanding the necessary high heat for the decomposition of water, and is charged with coke, breeze, charcoal, or other carbonaceous matter, the steam entering therein being resolved into hydrogen and other gases. Within the second retort is placed a quantity of bricks or other similar porous substance for the better decomposition of the petroleum. The third retort receives both the gases arising from the decomposition of the water and those resulting from the destructive distillation of the petroleum, and from thence, when combined, they pass to the purifiers or other apparatus.

For the purpose of controlling and injecting or introducing water, steam, or petroleum into the retorts, two or more cylinders with pistons and valves are employed similar to those of an ordinary steam-engine, serving the purpose both of a motor and a force-pump. Steam generated from a common boiler is admitted to the cylinder, and gives motion to the piston, which on its return stroke drives or forces the steam so admitted into the retort appointed for its decomposition into gas. Attached to this motor and force-pump, or in connexion with the shaft operated upon by it, is another but smaller cylinder or pump, which is used for injecting the liquid hydrocarbons or vapours into the retort adapted for their decomposition, the pump being in communication with a reservoir containing the petroleum or its vapour.

By proportioning the capacities of the cylinders and pumps, or by their adjustment so as to deliver regular and proper quantities of steam and hydrocarbons to the respective retorts, gases will be evolved, which, on being brought together and combined, will form a gas of uniform illuminating power. Gas of any required quality may thus be produced by altering or adjusting the capacities or speeds of the steam and petroleum pumps in relation to each other. Thus when gas of high illuminating power is wanted, less hydrogen is needed, consequently the capacity or power of the steam-pump must be diminished, while for poor gas the capacity of the steam cylinder must be increased.

In lieu of steam, water may be used for delivery into the retort or into a suitable boiler, where it is converted into steam, but in this case it will be necessary either to force the water or to take it from a sufficiently elevated source, so that by its head or fall the requisite power may be obtained.

The second part of this invention relates to the control or supply of a properly proportionate quantity of water or steam for augmenting the quantity and reducing the quality of gas when produced from cannel coal or other substances yielding gas of high illuminating power. This is effected by connecting a pump or pumps with the shaft of the station or other meter, which is made to protrude through and beyond the case for that purpose. By the revolution of the meter the requisite quantity of water or steam may be pumped into a boiler or reservoir, or direct into the retort where it is to be decomposed.

The third part of this invention has reference to regulating the supply of hydrogen or "water gas" to be used in combination with the vapours of liquid hydrocarbons, which in this case are not subject to decomposition. For this purpose a carburettor of considerable height, narrow, and of thin material (for better conducting the heat from the atmosphere and evaporating the spirit) is used. Within it is furnished with a series of shallow trays which will permit the liquid introduced at the top to flow over them from one to another, or instead of the foregoing the vessel may be provided with spiral channels or other contrivance whereby a large surface of liquid is exposed to the gas, which may be admitted at or near the bottom. In this case the water or steam is pumped into the retorts in the manner before mentioned, while the liquid hydrocarbons are also pumped into the vessel just described, care being taken to proportion the relative size and speed of the pumps so as to produce when the gases and vapours are combined a compound mixture or gas of the requisite illuminating power. The apparatus is so arranged as to admit of the introduction of the hydrogen or "water gas" at or near the bottom, while the compound gas or mixture is led off from or near the top. As hydrocarbons generally do not wholly evaporate at ordinary temperatures, the bottom of the carburettor is constructed so as to become a receiver for the non-vaporizable portion of the liquid, which may be removed from time to time as occasion may dictate.

The fourth part of this invention consists in the application of duly proportionate cylinders and pumps for the purpose of pumping or forcing atmospheric air and liquid hydrocarbons into carburettors when air is used in the place of hydrogen or "water gas."

The pumps hereinbefore mentioned need not be such as described, as any suitable pump or pumps may be used for the purpose.

APPLICATIONS FOR LETTERS PATENT.

3345.—Westwood, W. H., Wright, E., and Wright, E. T., Dudley, Worcester, "Improvements in stop or regulating valves for regulating or controlling the passage of liquids and gases through pipes or tubes, and for other like purposes." Sept. 30, 1874.

3346.—Robinson, F., Leytonstone, Essex, "An improved mode of and apparatus for the manufacture of gas." Sept. 30, 1874.

3351.—Lake, W. R., Southampton Buildings, London, "Improvements in galvano-hydrostatic apparatus for igniting, illuminating, and telegraphic purposes." A communication. Sept. 30, 1874.

3352.—Lynde, J. H., Sale, Chester, "An improved apparatus for saving water in water-closets, urinals, and other places where a fixed quantity of water is required at each operation." Oct. 1, 1874.

3366.—Beck, J., Cornhill, London, "Improvements in the process and apparatus employed in the making and condensing of oxygen and hydrogen gases." A communication. Oct. 2, 1874.

3404.—Trotter, H., North Shields, Northumberland, "An improved self-lighting and extinguishing apparatus." Oct. 6, 1874.

3439.—Huggett, J. A., Ferndale Road, Clapham, Surrey, "Improvements in ball-valves." Oct. 7, 1874.

GRANTS OF PROVISIONAL PROTECTION.

2962.—Sudlow, W. E., Oldham, Lancs, "Improvements in rotary engines for obtaining motive power, and for raising and forcing fluids." Aug. 29, 1874.

3174.—Kidd, J., Martin's Lane, London, "Improvements in gas-producing furnaces." Sept. 17, 1874.

3178.—Newton, W. E., Chancery Lane, London, "Improvements in filters for filtering or purifying water and other liquids." A communication. Sept. 17, 1874.

3182.—Forbes, Rev. G. H., Broughton, Northampton, "Improvements in the manufacture of cements." Sept. 17, 1874.

3190.—Marchant, R. M., Kirby Street, Hatton Garden, London, "Improvements in or connected with steam and other motive-power engines, part of the invention being applicable to the manufacture of gas." Sept. 18, 1874.

3193.—Holden, J., Halifax, Yorks, "Improvements in apparatus for lifting, forcing, or pressing by water, air, or other liquid or fluid." Sept. 18, 1874.

3200.—PUNSHON, R., Heatherleigh, Anerley Park, Surrey, "Improvements in fuel, applicable to heating and lighting purposes." Sept. 19, 1874.
3205.—CROSSLEY, F. W., Manchester, "Improvements in gas motor engines." Sept. 19, 1874.
3225.—M'INTYRE, J., Port Glasgow, Renfrew, N.B., "Improvements in apparatus for purifying sewage waters." Sept. 21, 1874.
3232.—FORBES, Rev. G. H., Broughton, Northampton, "Improvements in compounds designed for fuel or the production of quicklime." Sept. 21, 1874.
3240.—MALAM, W., Forest Hill, Kent, and GRAVES, T., Lavender Hill, Surrey, "Improvements in apparatus for mixing air with the vapour of liquid hydrocarbons to be used for lighting and heating, or for any other purpose; also in the treatment of such hydrocarbons with a view to purifying the same and obtaining a useful product therefrom." Sept. 22, 1874.
3257.—LASCELLES, C. T. E., Brockley Road, Kent, "Improvements in the utilization of gas-engines as motors for tramway cars and similar vehicles." Sept. 23, 1874.
3269.—SPICE, R. P., Parliament Street, Westminster, "Improvements in apparatus used in the manufacture of gas." Sept. 24, 1874.
3281.—DAY, ST. J. V., Glasgow, "Improvements in the manufacture of gas and in the means or apparatus employed therefor." A communication. Sept. 25, 1874.
3287.—FURNESS, G., Heaton Norris, Lancs, "Improvements in the construction of cocks and valves for controlling the flow of liquids and fluids." Sept. 25, 1874.
3304.—WHITE, M. G., Landport, Hants, "Improvements in self-acting apparatus for regulating the supply of water or other liquids." Sept. 26, 1874.
3307.—REDWOOD, T. B., Fairlawn, Finchley, Middlesex, "Improvements in the manufacture of gas for burning." Sept. 26, 1874.
3318.—WALLACE, J., Newcastle-on-Tyne, "Improvements in gas-burners and in apparatus connected therewith." Sept. 28, 1874.
3319.—BESSEMER, H., Queen Street Place, Cannon Street, London, "Improvements in apparatus for collecting and storing water for the supply of towns, villages, dwelling-houses, factories, and chemical or other works, and for agricultural purposes." Sept. 28, 1874.

INVENTION PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF COMPLETE SPECIFICATION.

3252.—CHANDLER, S., York Street, London Road, Southwark, and STEVENSON, G. W., Great George Street, Westminster, "Improvements in apparatus used in the manufacture of gas." Sept. 23, 1874.

NOTICES TO PROCEED.

1602.—FISHER, D., Pimlico, London, "Improvements in meters for measuring water and other fluids." May 6, 1874.
1709.—BUDENBERG, A., Manchester, "Improvements in meters for measuring the flow of liquids." A communication. May 14, 1874.
1826.—GOODALL, R., Armley, Leeds, Yorks, "Improved means or method of clarifying sewage and impure waters from dye-works, bleach-works, tanneries, mills, and manufactories, and rendering the precipitate or 'sludge' combustible and useful as fuel." May 23, 1874.
1973.—MATTHEWS, H., Bristol, Gloucester, "Improvements in apparatus for preventing the return or back flow of gas, water, and other fluids in sewers, drains, and other similar situations." June 6, 1874.
2964.—MILLER, W., Boston, U.S.A., "Equalizing or distributing pressure." Aug. 29, 1874.
2968.—SILBER, A. M., Whitecross Street, London, "Improved apparatus for lighting and heating purposes." Aug. 31, 1874.
3252.—CHANDLER, S., York Street, London Road, Southwark, and STEVENSON, G. W., Great George Street, Westminster, "Improvements in apparatus used in the manufacture of gas." Sept. 23, 1874.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

1171.—SHORT, T., Glasgow, "Improvements in apparatus for purifying sewage." April 4, 1874.
1175.—PEARSON, E., Old Kent Road, London, "Improvements in water-closets and in taps for the same, also applicable to other purposes." April 4, 1874.
1176.—PEARSON, E., Old Kent Road, London, "Improvements in taps, cocks, or valves for adjusting or regulating the flow of liquids and gaseous fluids." April 4, 1874.
1207.—PETERS, S., and DONALD, W., Glasgow, "Improvements in and connected with water-closets, and in part applicable for the supply or discharge of various liquids." April 7, 1874.
1215.—RONALD, B., and FARMER, J., Glasgow, "Improvements in the modes of and apparatus for regulating the supply of water to water-closets and other vessels." April 8, 1874.
1256.—SUFFIELD, T., East Lane, Bermondsey, London, "Improvements in pumps, chiefly intended for acids and other corrosive liquids." April 11, 1874.
1308.—GOTTHEIL, R., Berlin, "Improvements in apparatuses for measuring the supply of water passing through pipes." A communication. April 16, 1874.
1510.—BOND, F. T., M.D., Gloucester, "The preparation of improved materials for disinfecting and deodorizing purposes." April 30, 1874.
1957.—HAZLEHURST, G. S., Runcorn, Chester, "Improvements in apparatus for pumping liquids, particularly applicable for pumping acids." June 5, 1874.
2071.—RUMPFF, C., New York, U.S.A., "A new or improved dry process of oxodizing 'anthracene,' and improvements in the manufacture of dyes and other colouring matters from the product so obtained." June 15, 1874.

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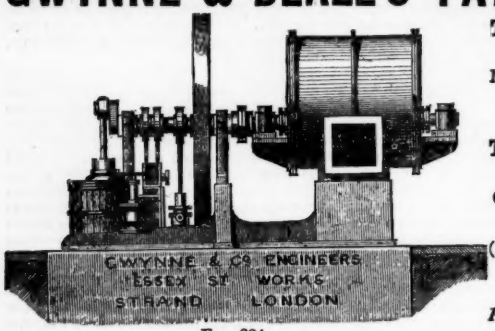

FIG. 224.

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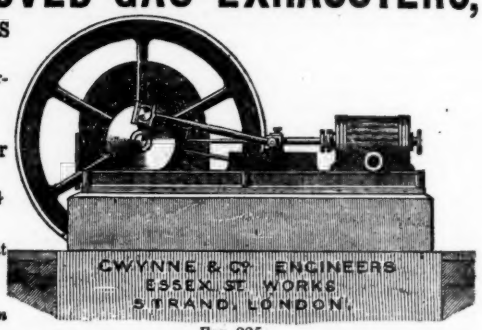

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the most perfect system of action yet discovered. Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the excellence of the article produced, and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

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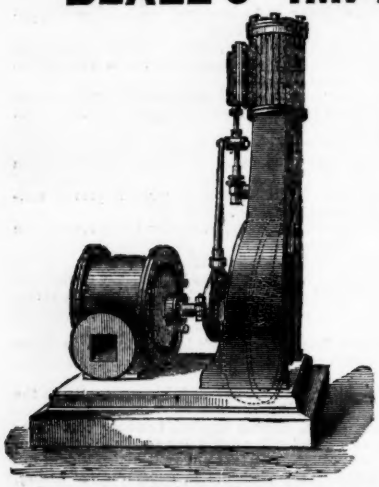

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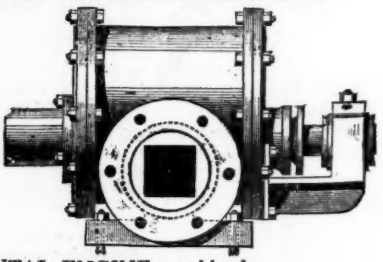

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JAMES RANDALL, Secretary.
Edmonton, Oct. 13, 1874.

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5, Charles Street, Wrexham, Sept. 21, 1874.

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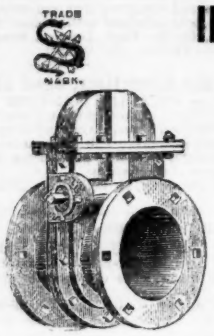

WITH WROUGHT-IRON PINIONS,

List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO, SCREW WATER-VALVES WITH GUN-METAL FACES.
ALSO SOLE MAKERS OF
J. BEALE'S NEW PATENT GAS EXHAUSTERS.

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LIME SUPERSEDED
IN THE
PURIFICATION OF ILLUMINATING GAS
BY
SPENCE'S PATENT DRY COPPERAS.

The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.

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MANUFACTURERS OF
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PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

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UPHELD FOR FIVE YEARS FREE OF CHARGE.

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FOR
GAS HYDRAULIC MAINS.

SAVES COAL, RETORTS, FUEL, LABOUR, TIME, SPACE, AND CAPITAL.
PREVENTS STOPPAGE OF ASCENSION-PIPES, DEPOSITION OF CARBON IN RETORTS, THICKENING OF TAR IN HYDRAULIC MAIN.
GIVES MORE GAS PER TON OF COAL, WITH HIGHER ILLUMINATING POWER, SATISFACTION, AND PROFIT TO SHAREHOLDERS AND MANAGERS.
IS STRONG, SIMPLE, EASILY FIXED AND WORKED, AND THOROUGHLY EFFICIENT AT ALL TIMES.

TESTIMONIAL.

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As your statements respecting your apparatus are fully confirmed by the results obtained in practical working, I should wish you at once to fix one to each of the ovens at these works, that I may obtain all possible advantage during the coming winter.

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Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

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COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¾ to 2 inches and upwards. They cost less than the ordinary plan.

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For which Estimates will be given on application,

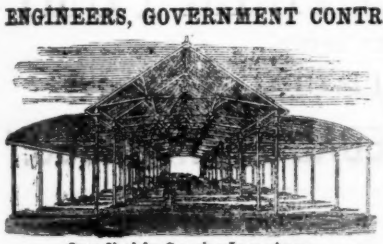
ERECTED COMPLETE IN THIS COUNTRY

OR

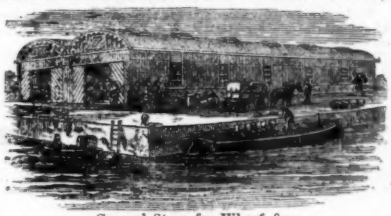
PREPARED TO PLAN FOR ERECTION ABROAD,

EITHER WITH

TIMBER FRAMING or WHOLLY in IRON.



Open Shed for Covering Large Areas.



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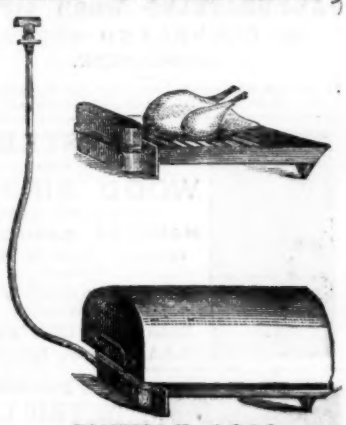

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A 7-lb. JOINT ROASTED TO PERFECTION FOR ONE HALFPENNY.

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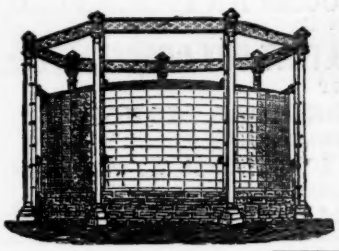

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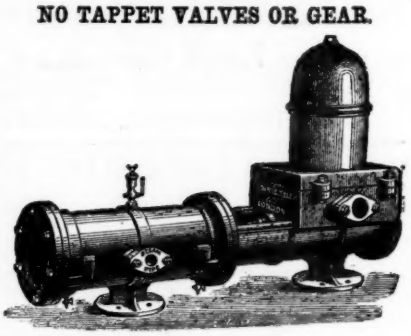

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One selected from amongst many Testimonials received by H. T. & Co.:—

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"Yours truly,
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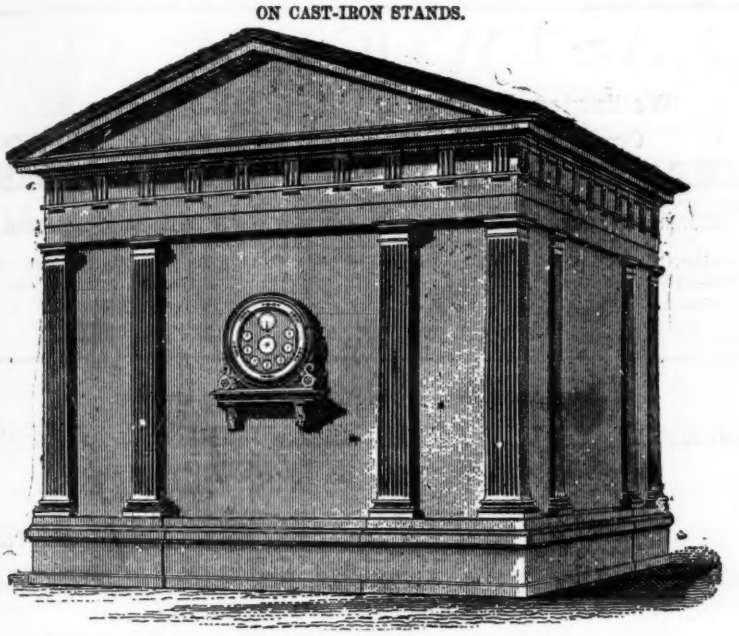

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GAS COOKING APPARATUS.

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MANUFACTURE EVERY DESCRIPTION OF

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INTERNATIONAL EXHIBITION, 1862.

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MAIN SEAM CANNEL COAL.

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Analysis and Price on Application.

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CAST-IRON GAS AND WATER PIPES.
MALLEABLE IRON TUBE FOR GAS, WATER, AND STEAM.
AGENTS FOR THOMAS GLOVER & CO.'S
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DELIVERY F.O.B. ON CLYDE.
Lists on application.

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GAS and WATER PIPES,
Bends, Tees, and Irregulars,
AND
GENERAL FOUNDERS.
ESTIMATES and PRICES on APPLICATION.

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GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
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GAS, STEAM, AND WATER FITTINGS.

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PATENT
LAMP REGULATOR

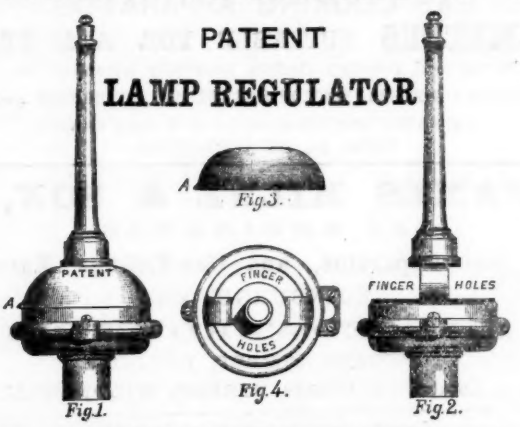

Fig.1. *Fig.3.* *Fig.4.* *Fig.2.*

D. BRUCE PEEBLES AND CO.,
ENGINEERS, WET AND DRY GAS-METER MANUFACTURERS,
PATENTEES OF
GAS REGULATORS FOR PUBLIC LAMPS, FACTORIES, PUBLIC HALLS, AND DWELLING-HOUSES.

Attention is respectfully requested to the following extract from a lecture "On the Economical Combustion of Coal Gas," delivered to the Philosophical Society of Glasgow, by Dr. W. Wallace, F.R.S.E., F.C.S., Gas Examiner for the city of Glasgow, on the 4th of March last:—
"A few years ago, a simple form of Gas Regulator for Street Lamps was introduced, I do not know by whom, and various forms of it, and improvements on it, have been made by many practical gas engineers. Of all the modifications of the instrument, the best in my opinion is that of Mr. D. Bruce Peebles, of Edinburgh; in fact, his Lamp Regulators are so superior that they are likely to supplant all others. Already about 9000 of these have been applied to the street-lamps in Glasgow, and I understand it is the intention of the authorities to introduce them all over the town. The saving thereby effected I calculate to be about £6000 per annum, without any diminution of light. One of the great advantages of Mr. Peebles's apparatus over all others is that it can be regulated while the gas is burning."
Since the above date, another 1000 have been supplied to Glasgow, and they are being largely adopted at home and abroad.

D. B. P. and Co. are prepared to Estimate for the Supply and Maintenance of their Regulators, and will be glad to forward terms on application.

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Yields 11,600 cubic feet of 34·3-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

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THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD,

STRONGLY RECOMMEND A TRIAL OF THEIR

CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

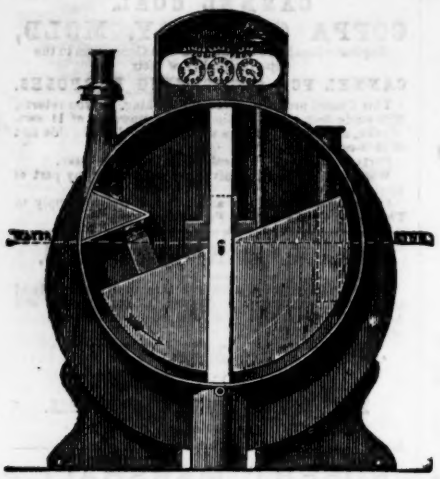
	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by [illegible]ous Gas Companies throughout the Kingdom, who bear strong testimony to their value.

APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.



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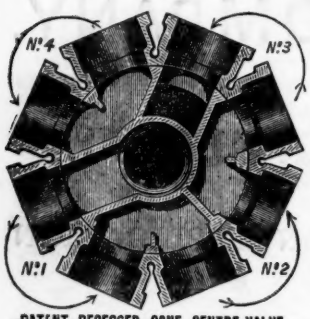

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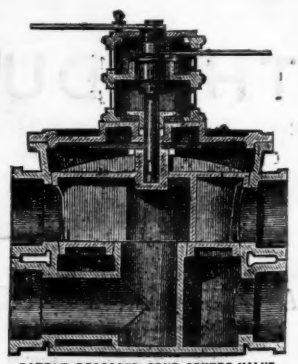
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